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Editor - WILLIAM J. MEGILL

CONTENTS

FEBRUARY 1961 ✦ VOLUME LXII ✦ NUMBER 2

COVER SUBJECT: — *Winter at Mount Rundle, Alberta.*
By courtesy of the Southam Printing Company

	Page
THE HUDSON STRAIT EXPEDITION 1927-28 *by WING COMMANDER R. V. MANNING, D.F.C., C.D.*	40
THE NATIONAL AVIATION MUSEUM *by SYLVIA SEELEY*	54
"THE FIRST SNOW" (painting by Cornelius Krieghoff)	60
ACHILL ISLAND — HUNTING GROUND OF THE BIG FISH *by P. W. F. GRIBBON*	62
THE LAKE OF THE TWO MOUNTAINS *by W. E. GREENING*	66
EDITOR'S NOTE-BOOK	III
AMONGST THE NEW BOOKS	III

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The articles in this Journal are indexed in the *International Index to Periodicals* and in the *Canadian Index*.

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"... all of these features made aerial navigation somewhat difficult, and especially in the w on oc recognize land marks or tell land from ice when covered with snow." Report tor, Civi

The Hudson Strait Expedition 1927-8

by WING COMMANDER R.V. MANNING, D.F.C., C.D., Air Historian

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The Expedition is Prepared

BY THE late 1920's the Canadian government was committed to completion of the Hudson Bay Railway. What was not known, however, was the facility with which ocean shipping could use Hudson Strait, the 500-mile channel of stormy, ice-menaced sea that separates Baffin Island from the Labrador mainland. In January of 1927 an inter-departmental committee consisting of representatives of the Department of Marine and Fisheries, the Department of Railways and Canals, and the Department of National Defence was formed to organize an expedi-

in the ... on occasions it was almost impossible to
Report ... tor, Civil Government Air Operations.

tion which, by means of aerial reconnaissance and photography, would establish absolute time limits for safe marine navigation through the strait.[1] It was hoped that the further purpose would be served of determining the usefulness of aircraft as an aid to marine navigation and of testing the suitability of various equipments for air operations in the Arctic.

The general plan prepared by the committee called for the building of three bases, one at each end of Hudson Strait and one halfway between. Each base was to have an establishment of two aircraft with all the necessary supporting facilities. A high-powered, long-wave radio station would be built at each site which would permit daily broadcasts to Ottawa of the reports brought in from aircraft patrols. Suitable dwellings would have to be erected which could withstand an Arctic winter and the constant winds for which the Strait was famous. Hangars would have to be erected, slipways built, and a mass of stores, fuel, and foodstuffs unloaded in a comparatively little-known region at unprepared sites in time to permit the transporting ships to leave before ice fields barred their way to the open sea.

To fly and maintain the aircraft the RCAF provided a detachment of six officers and twelve airmen under the command of Flight Lieutenant (acting Squadron Leader) T. A. Lawrence (now Air Vice-Marshal, ret'd). The Canadian Army supplied one officer and three soldiers of the Royal Canadian Corps of Signals who were to set up and maintain the air-to-ground wireless equipment. An RCMP constable was allotted to each proposed station. The civilian component, made up of 19 persons including three doctors, was supplied by the Department of Marine and Fisheries, bringing the total complement for the three stations to 44.

The selection of suitable aircraft presented a problem. They would need to be capable of operating from wheels, floats, or skis, would need to be of rugged construction, have cabin fuselages, if possible, for some protection against the elements, and be fitted with thoroughly reliable engines which could be operated under conditions of extreme cold. No aircraft was available for sale that met these requirements, but the brilliant designer and builder of some of Germany's most famous fighters of World War I, Anthony Fokker, had set up a small aircraft factory the previous year at Hasbrouck Heights, New Jersey, and had designed the famous five-place cabin monoplane known as the Fokker Universal with an open pilot's cockpit and a single Wright 225HP radial engine. On Fokker's promise that he could produce the required aircraft within three months, six aircraft modified to RCAF specifications were ordered.[2] Fokker lived up to his contract

(1) PC 83 of 22 January 1927. Mr. N. B. McLean of the Department of Marine and Fisheries was chairman of the committee and officer-in-charge of the expedition. Group Captain J. Stanley Scott, M.C., A.F.C., the Director, RCAF, represented the Department of National Defence until 1 July when, on reorganization of the Air Services, he was replaced by Wing Commander Lindsay Gordon, D.F.C., the newly appointed Director of Civil Government Air Operations.

(2) Although these aircraft were ordered at the request of the RCAF and were flown and maintained by RCAF personnel, the aircraft were paid for by the Department of Marine and Fisheries and bore civilian registration numbers.

XUM

and the aircraft were delivered to Camp Borden in time for some flight trials to be made before the aircraft had to be loaded on board ship.

By July of the same year, 1927, personnel, stores, and aircraft had been assembled at Halifax and on the 17th of that month the expedition sailed under the charge of Mr. N. B. McLean of the Department of Marine and Fisheries. Two vessels were used to convey the expedition to its destinations: the CGS *Stanley*, an icebreaker, carried the personnel to man the bases, while the SS *Larch*, a freighter, carried 5285 tons of coal and general cargo, and a construction crew of 57 men. An especially happy inspiration had been the decision to carry a small Moth seaplane on the afterdeck of the *Stanley*, which could be lowered over the side of the ship, and which was to save days and even weeks in the search for suitable sites from which the Expedition's flying operations could be carried out.

Three Stations Are Built

Port Burwell, the tentative location for Base "A", was reached on the 27th of July. It is a land of bare, wind-swept rocks and towering cliffs that are often shrouded in mist. Wildlife seems to shun the area and the Eskimo name for it, Killineck, "the end of the earth", is not without its appropriateness. Here the Moth seaplane was lowered into the water for the first time and Squadron Leader Lawrence made a flight to select a suitable site for the first base, Base "A". Because of the lateness of the season and the difficulties of the terrain, it was decided to rent the abandoned Moravian building from the Hudson's Bay Company to provide housing for personnel, to erect the power house near it, and to build the hangars and storehouse about a third of a mile away at Fox Harbour. The cliffs prevented the hangar from being built near the water edge and a derrick had to be erected to lower the aircraft to a slipway, or onto the ice when skis were being used. A further complication was a 22-foot tide which, when the sea was frozen, would cause the entire ice pack to rise and fall, leaving jagged crags of ice adhering to the cliffside at low tide.

Because ice floes would make their first ap-

Base "C" personnel including Mr. McLean and Mr. O'Malley. From left to right: Tiaro; Bobby; Romeo Lemieux; Flight Sergeant G. Black; Ohecto; Corporal J. F. Riggs, RCAF; Corporal Bulteel, RCCS; Flying Officer B. Carr-Harris, RCAF; Squadron Leader T. A. Lawrence, RCAF; Danny; N. B. McLean; Dr. W. J. K. Clothier; Lieutenant W. L. Laurie, RCCS; Sergeant A. Caggie, RCAF; J. R. O'Malley; Constable James Murray, RCMP; Corporal A. H. Warner, RCAF.

pearance at the western entrance of Hudson Strait, it was thought prudent to establish the bases in sequence from west to east. After exploratory flights had been made at Port Burwell, the expedition sailed west leaving a detachment of four men with a motor boat and two months' supplies to start preliminary work on Base "A".

Nottingham Island, at the western end of the strait, was reached on the third of August. Again the Moth was lowered over the side, and a suitable site found on the southernmost corner of the island about one half-mile from the mouth of an inlet running approximately north and south. This was the only suitable site on the island and without the aid of the Moth might not have been discovered by weeks of searching. It was decided to erect the buildings on a small meadow sloping towards an inlet and completely surrounded by low hills and ridges. The hangars were to be placed as near high-water mark as possible for convenience in launching the aircraft.

Unloading began at once and by the 17th, equipment and supplies to the extent of seven hundred tons had been carried to the beach from a mile offshore by surf boats and a scow. Dense fog was the principal impediment to progress as the two boats regularly became lost between the ships and the beach. Temporary accommodation was complete by the 18th of August when the permanent party (under Flight Lieutenant A. A. Leitch, M.C., D.F.C.) and the construction crew were left at the base, and both ships sailed east to establish the third base, Base "C", it having been arranged that the *Stanley* would return later in the year to collect the construction crew for the passage south. Shortly before the ships sailed, a message was received from the Hon. Charles Dunning, Minister of Railways and Canals, announcing that the northern terminus of the Hudson's Bay Railway would be Fort Churchill.

Extensive air patrols and coastal exploration on the south coast of Baffin Island failed to disclose the flat beaches needed to permit the unloading of supplies in the short time

XUM

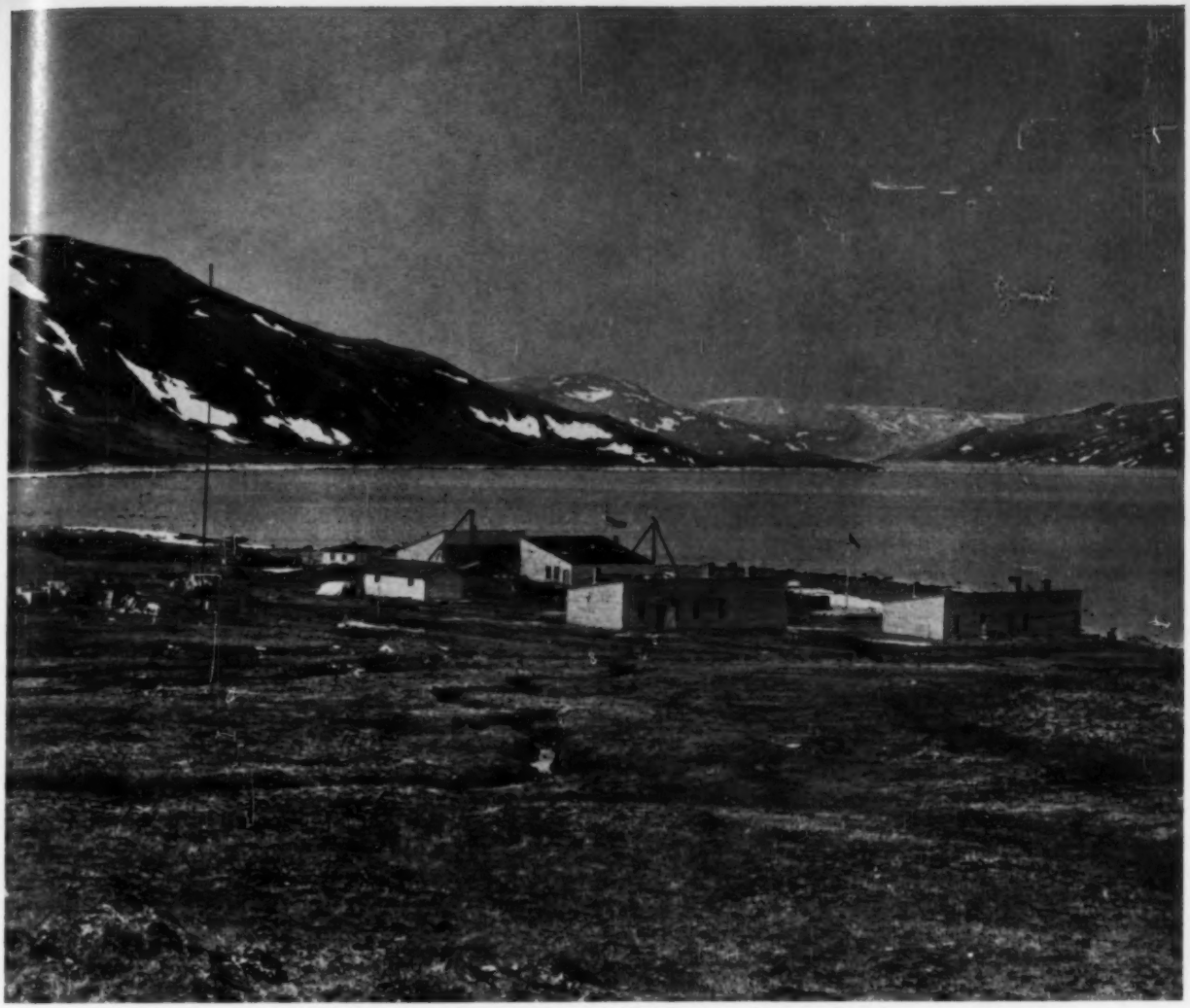
"Unloading (at Wakeham Bay) proceeded in much the same manner as at Nottingham Island, but benefiting by experience, a better sequence of bringing ashore supplies as required was followed and the work proceeded more smoothly and rapidly." Report to the Director, Civil Government Air Operations.

remaining and the search turned to the southern shore of the Strait. A reconnaissance by the invaluable Moth disclosed an acceptable site at Wakeham Bay, where there was sheltered water by a small meadow which sloped gently to the beach.

Unloading followed the pattern established at Nottingham Island but a better sequence of bringing supplies ashore worked out by Mr. J. R. O'Malley, Secretary of the Expedition, facilitated their disposal from the beach. There was no need at this base to wait for suitable tides for unloading, but a long beach at low tide increased the difficulty, and the exposure of the beach to the prevailing winds caused operations to be impeded occasionally by heavy seas. On the completion of unloading on the 11th of September, the ships returned to Port Burwell, again leaving behind a permanent party and a construction crew, this time in charge of Squadron Leader Lawrence.

At Port Burwell the permanent party was established under Flight Lieutenant F. S. Coghill. Large boulders impeded the laying of foundations, but the work progressed steadily, and by the time the construction crew had to board ship, had reached the stage when the permanent party would be able to complete it before cold weather set in.

On the 11th of November the *Stanley*, having embarked the construction crews from all three sites, sailed south for home in company with the *Larch*. Mr. McLean, the leader



"The buildings were all erected in a small meadow sloping slightly to the beach with a fine stream of water on one side. The hangars were placed just above extreme high water mark and planes could be launched at any stage of the tide as the beach had been improved." Report of the Hudson Strait Expedition, 1927-8.

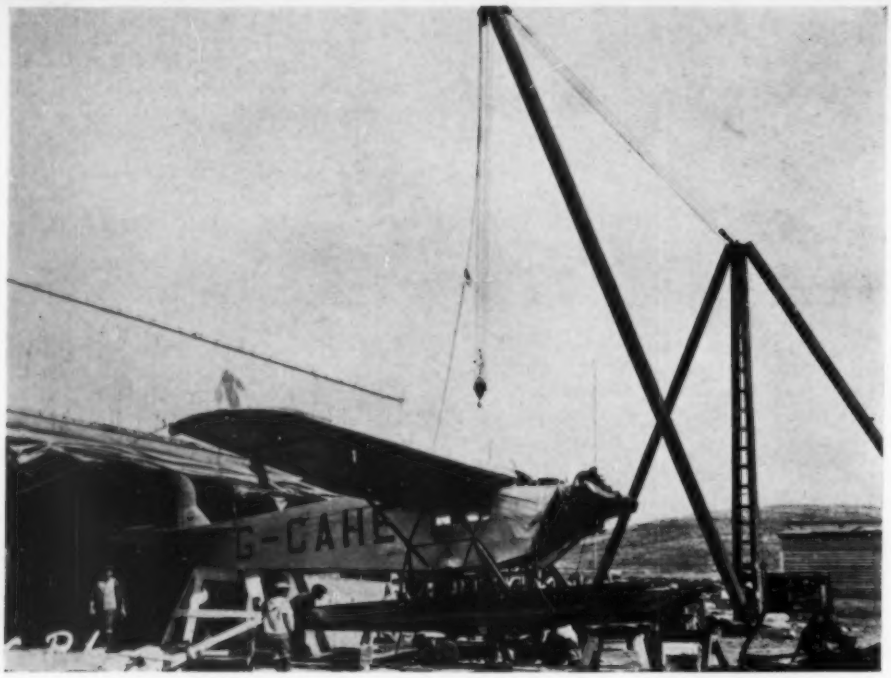
of the expedition, had fallen ill and sailed with the ships, leaving Squadron Leader Lawrence in charge of the expedition.

Flying Operations Begin

It was the aim of Squadron Leader Lawrence and his men to fly daily patrols from each base to collect data on meteorological and ice conditions. For the first few weeks after the establishment of the bases, however, bad weather restricted the flying from all three bases. Hills in the vicinity would be obscured for days at a stretch and dense fogs would roll in on an average of one day in three.

Base "C" at Wakeham Bay began flying operations, making its first reconnaissance on 30 September. In the 53 days between the start of patrols and the freeze-up in November, patrols were possible on only 10 days; snow and fog prevented flying on 24 days, and on 19 other days aircraft were grounded because of high winds and heavy formations of shore ice. An 18-day period of forced inactivity followed the suspension of the use of pontoons until the first flights could be made on skis on the 12th of December. Skis continued to be used until the 18th of June when the spring break-up of ice forced a suspension of flying until the 30th of June when it was possible to use pontoons again. Flying ceased on the 18th of August.

Base "B" at Nottingham Island began operations on the 11th of October. On the



"Two four-ton derricks were supplied to each base. One of these derricks was erected as closely as possible to the high water mark; the other placed in such a position as to be available for hoisting of aircraft or engines, immediately between the two hangars, which faced each other."
Report to the Director, Civil Government Air Operations.

16th of November the first ice was sighted in the Strait and on the same day the cove froze over and further flying on pontoons became impossible. Since Nottingham Island was much colder than the other bases, the interval between the use of skis and the use of pontoons was only seven days, and patrols with ski-equipped aircraft resumed on the 23rd of November, continuing until the 30th of May when break-up occurred.

Port Burwell suffered the worst weather conditions of the three bases. It flew its first operation on the 23rd of October but found its operations continually hampered by high winds, snow, and limited visibility. When it was necessary to start flying on skis, unsafe ice conditions along the shore and in the cove created hazards and interminable labour. Every tide undid the efforts of personnel to construct a taxi-way from the hangars over the rough ice to the level ice farther out in the bay. At this base 19 days' flying was lost between the last operation with pontoon-equipped aircraft and the first with ski-equipped aircraft, and an even longer delay occurred in the spring.

From the start of operations on 30 September 1927 until their termination on 18 August 1928, the three bases flew 227 patrols for a total of 370 hours and took 2285 photographs.

Operating Procedures at the Three Bases

The Fokker Universals proved to have been a good selection for Arctic operations. They did have a weakness in the pontoons and their fittings, however, which caused periodic unserviceability and which was the principal cause of the last-minute failure to fly the aircraft back to civilization in the summer of 1928 when the expedition was brought to a close. Their Wright Whirlwind engines were especially easy to maintain. Only once did a forced landing occur because of engine trouble, and on this occasion a partially plugged fuel line did not prevent the pilot from keeping his aircraft in the air until within a mile of his base.

Engine-starting presented no problem, although the aircraft were not kept in heated storage. In temperatures below freezing heat was brought to the engine by means of an asbestos nosebag and blow torches. During the heating process, which lasted for approximately 30-40 minutes, the airscrew was turned intermittently by hand until ease of turning would indicate that the engine was ready for starting. At this point warm oil was put in the tanks, the bag removed, and the engine started. At the conclusion of a flight the procedure was reversed and the warm oil drained. Sad experience proved that the oil should be drained while the engine was

ticking over; otherwise it would freeze before running out, clogging pipe lines and the crankcase, and adding hours of extra work to the thawing-out process.

The separation of the pilot's cockpit and the cabin of the Fokker Universal had its disadvantages for photography, when it was important that the camera operator and the pilot knew what the other was doing, but was not disliked by the pilot for any other reason. One of the reports of the period refers to the eminent suitability of the open cockpit for flying through dirty weather. No particular discomfort was blamed on the open cockpit. On February 19th, 1928, when there was a ground temperature of 27 degrees below, an aircraft took off on a flight that lasted for three hours and forty minutes. For the greater part of this flight an altitude of 8000 feet was maintained where there was a temperature of about 50° below zero. On landing the pilot reported that he had been very comfortable.

Each aircraft carried the new CT21A wireless transmitter, which had a range of approximately 100 miles for voice and 500 miles for key transmission, and which permitted an aircraft to communicate with its base but not receive a message in return. Nottingham Island, the most westerly of the bases, often could pick-up the transmissions from aircraft working out of Port Burwell, the most easterly base. A remote switch was installed for use of the pilot. During the winter months the pilots preferred the wireless key to voice because of the inconvenience of handling a microphone while wearing face masks and heavy mitts. Reliability of the airborne wireless equipment was high. On 175 flights on which wireless was used, there were only three cases of failure, and on all occasions when the aircraft had to land away from base, the pilot was able to report the cause and the approximate location before coming down.

Three Incidents

Although the Hudson Strait area is one of the most hazardous in the world in which to carry out flying operations, on only three occasions did aircraft fail to return to base at the expected time and on no occasion was

"The aircraft were towed to the water's edge on the beach-dolleys by the use of the tractor, and taxied into the water under their own power." Report to the Director, Civil Government Air Operations.

there injury or loss of life.

The first incident occurred when Flight Lieutenant Leitch was returning from Erik Cove at Cape Wolstenholme to Nottingham

Squadron Leader T. A. Lawrence.

Island. Severe snow storms were encountered half-way across, and when Leitch had flown for a sufficient length of time to have brought him to his base and had still not sighted land, he decided that it would be prudent to land on the floe ice and to wait for clearer weather. A landing was made, the oil was drained from the engine, and the crew made themselves as comfortable as they could with the use of their emergency equipment. The following day the weather was clearer and, although land was not in sight, Leitch made an estimate of his position and decided to take-off. The oil was heated with an engine heating unit carried in the emergency kit of the aircraft and the engine started without trouble. After take-off, Leitch followed a course north-east from his forced-landing point until he was successful in picking up land, which proved to be the extreme north-west end of Nottingham Island. The aircraft arrived back at its base with about one quart of gasoline in the tanks. The temperature at the time of this incident was approximately 16 degrees below, but only a few minor frostbites had been experienced by the personnel.

The second incident occurred when Squadron Leader Lawrence was flying from Wakeham Bay to Nottingham Island in early January of 1928. Heavy snowstorms were encountered about 20 miles east of Cape Digges, and Lawrence decided to return and land at Sugluk Inlet to wait for better conditions. The following day another attempt to get through to Nottingham was made and equally bad weather encountered. The decision was then made to return to Wakeham Bay, but again snowstorms encountered near Cape Weggs forced a landing to be made in Deception Bay. The aircraft and crew were forced to remain here for nine days during which time "typical Arctic weather prevailed". On the eighth day, while making ready for take-off, a search aircraft arrived from Wakeham Bay. By the time that Lawrence's aircraft, which had been exposed to the weather for eight days, was dug out and made ready for flight, the short day was almost over. Both pilots decided to stay overnight at Deception Bay, returning to their base at Wakeham the following morning.

A month after Lawrence's safe return a third crew was reported missing. On the 17th of February Flying Officer A. Lewis with his mechanic, Flight Sergeant N. C. Terry, and an Eskimo guide, "Bobby",[3] left Port Burwell to make a patrol northward to Resolution Island, half-way up Frobisher Bay, and to return to base by way of Grinnell Glacier and the Strait. On the return flight, however, the crew ran into difficulties which are described vividly by the pilot in his story of his experience.[4]

"Weather and visibility on the outward trip were reasonably good but deteriorated rapidly on the homeward trip to the extent that having crossed Grinnel Glacier on Baffin Island and having reached the Strait we ran into heavy snow of blizzard proportions. I was forced to let down to within a few feet of the ice-pack where accurate navigation became well nigh impossible, what with the local magnetic disturbances, the oscillations of the compass needle, the extreme turbulence of the air and almost zero visibility. I was endeavouring to allow for at least 20

(3) An important and versatile part of the emergency equipment carried on flights was an Eskimo helper, who was to serve as a guide, hunter, and builder of snow huts in the event of a forced landing.

(4) *Adrift on Ice-floes. A Story of the Hudson Strait Expedition*, by Group Captain A. Lewis, RCAF.

Aerial view of Base "C" at Wakeham Bay, The Hudson's Bay Company's post is in the foreground.

"Tons of ice and snow (at Wakeham Bay) were chopped down, filled in, levelled off and packed into a runway, using the tractor as a roller. At each change of tide, this runway, which extended across a beach about 200 yards long, would heave up and crack until eventually after much labour it became a solid bridge of ice, rising and falling with the tide, but immune to serious damage." Report to the Director, Civil Government Air Operations.

XUM

degrees drift to the port, but it was more guesswork than technique for my chief problem was to keep right-side up by visual means, for there was no such aid as a directional gyro or a turn-and-bank indicator."

"It was obvious that it would have been next to miraculous for us to have reached our base under these conditions and in any event by this time our fuel, which had been barely enough to reach home under ideal conditions, was almost exhausted. It was imperative that a decision be made immediately, for total darkness was rapidly approaching and there were only two alternatives open to us, either to run out of fuel and then attempt a landing without an engine or to find a reasonably level stretch of ice and use our last drop of fuel to make a power-on landing. The blizzard was of such proportions that by landing into it there should be practically no run after touching down, practically eliminating any danger of a head-on collision into any of the numerous ice-pinnacles."

Through his wireless set Lewis had been able to communicate with his base since take-off, and immediately before attempting a forced landing reported that he was lost and would have to land on the icepack. At 1510 hours, after the Fokker had been airborne for well over four hours, Port Burwell received a final message, "Landing on ice in middle Ungava."

Lewis' estimate of his position was seriously in error. The aircraft had been blown far east of its track in the blinding snow storm and when it landed on floe ice its position was far out in the Atlantic ocean off the east coast of Labrador. This was not realized by Lewis and his two companions at the time and, after a reasonably comfortable night in a hastily-built igloo, the small party started marching eastward to what they hoped would be the eastern shore of Ungava Bay.

After a day's march to the east in stormy weather conditions, a second igloo was built and the party prepared to bed down for the night. Flying Officer Lewis by now was concerned by the failure of ice pinnacles to grow smaller and the floes less rough, which was what one would expect as the shoreline was approached. They were in fact doing the reverse. He slept on this disquieting thought.

"The following day", his narrative continues, "broke clear and cold. We were completely surrounded by tightly packed ice-pinnacles and could not immediately sight anything on the horizon, although if we were really in the Atlantic, we could not possibly be beyond sight of the Labrador mountains. Climbing to the top of one of the pinnacles, I glanced to the west. There, clearly etched in the sky, were what appeared to be mountain peaks white with snow. A rough calculation convinced me that we must be 50 miles out in the Atlantic, and with renewed hope we turned and began to retrace our steps in a westerly direction."

After several days travelling, the food in their emergency kit and the fuel for their primus stove was used up, and the three men had to live on raw meat from walruses which "Bobby", the Eskimo, shot.

Seemingly endless lanes of open water had to be crossed on the inflatable rubber raft that they carried. After seven days of hard travelling and much privation, they reached the coast of Labrador and walked north along it for four days. The land was barren and with no sign of life. The men continued to suffer greatly from cold and hunger. At last, the fifth day after reaching the coast, they came upon an Eskimo hunter and his wife who gave them food and provided a dog team by means of which they were conveyed to Port Burwell after an absence of 13 days.[5]

During the time that Flying Officer Lewis and his companions had been missing, aircraft from the three bases had been standing by to search for the men, but the coldest and stormiest period of the winter had settled on Hudson Strait and on only three of the 13 days was it possible to do any flying. The flights that were flown were carried out in spite of very bad weather, but the erroneous position report kept them from contributing to the rescue of the missing group.

Preparations for the Return Home

Operations continued from the three bases with the remaining five aircraft until August, when navigation conditions in the Strait became such that further aerial observations were unnecessary. The original plan of the expedition had been that the aircraft would return to Ottawa by air. To make this long journey possible, caches of aviation fuel had

(5) Squadron Leader Lawrence immediately gave "Bobby" the BSA sporting rifle that had been part of the emergency equipment of the lost aircraft for his part in the rescue of his two companions and promised him a boat. A recommendation to this effect was made through official channels but nothing further seemed to have happened until 20 years later when some inquiries re-opened the matter.

Inspection of emergency equipment before a flight in search of Flying Officer Lewis and his crew. The regular crew of an aircraft consisted of a pilot, engine mechanic, and Eskimo guide. The wisdom of including an Eskimo was amply demonstrated in the Lewis incident.

been established along the east coast of Hudson Bay with the assistance of the Hudson's Bay Company and temporary moorings and emergency rations placed at some of them.

Late in August the Fokkers were assembled at Erik Cove on Cape Wolstenholme preparatory to the southward flight. Erik Cove had been chosen for rendezvous because the cove at Nottingham was considered too hazardous for the take-off of five aircraft simultaneously and, if the aircraft took off individually, the inadequate servicing facilities would cause too long a wait from the time the first aircraft took off until the last aircraft took off and all were formed up in the air. Squadron Leader Lawrence described how the ambitious undertaking had to be abandoned.

"On the morning of August 25th heavy seas were running into Erik Cove from the north-east, and made the manoeuvring of the aircraft on the water somewhat difficult. Formation on the water was effected in spite of this and take-off started. Three of the five aircraft took off successfully, one crashed with a pontoon broken off, and the other failed to get off, having engine trouble.

"The three occupants of the crashed machine were taken off their now sinking aircraft by Flying Officer B. G. Carr-Harris, who landed beside them immediately on seeing their plight. Radio calls for assistance were sent out from the aircraft flown by Squadron Leader Lawrence to the ships of the expedition, now located about 85 miles to the east in the strait. Signals were also given to Flight Lieutenant Leitch to return to his base to verify the S.O.S. calls to the ships through the ground radio station. The wrecked aircraft was salvaged and eventually loaded with others on board ship.

"Examination of the remaining aircraft, four in number, found that two of them were unfit to undertake the flight south. These machines were affected by the same trouble as the one which had crashed, that of weak-

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Heavy close-packed ice in Hudson Strait, a serious threat to navigation.

ened undercarriage gear and pontoon fittings.

"Taking into consideration the present condition of the remaining aircraft, the large portion of the flight yet to be made, the unknown sea conditions which had to be encountered, and the known weak points of the pontoons and undercarriage gear, it was then deemed best to cancel the flight and ship the remaining aircraft out by boat. Rather this than encounter almost certain similar troubles in more isolated areas yet to be covered, and the loss of more aircraft and equipment."

Three of the aircraft now unfit for flight were dismantled and loaded on board ship at Erik Cove. The other was flown back to Wakeham Bay to be loaded on board ship there and with its arrival the air operations of the expedition came to an end.

On November the 14th, the CGS *Montcalm*, carrying most of the personnel of the expedition, arrived to a tumultuous welcome at Quebec City. The Hudson Strait Expedition of 1927-28 had been brought to a successful conclusion.

Reports on the Expedition

Squadron Leader Lawrence's report to his superiors[6] described the difficulties encountered by the expedition and made important recommendations on the improvement of aircraft equipment for employment under Arctic conditions. Difficulties of ice and weather have been described earlier. A serious handicap was the absence of good maps and charts. Islands existed which were not charted and others which were charted were incorrectly located. The configuration of the coast was not clearly shown, which made aerial navigation difficult, especially in the winter, when a covering of snow made land and ice almost indistinguishable.

Navigation was further complicated by the nearness of operations to the North Magnetic Pole. The approximate magnetic variation throughout the Strait was given as 45 degrees west but was found at times to be as much as 50 degrees. Compasses in use were erratic and in some localities their use for navigation was unsafe. An especially noticeable error occurred in the compasses in the vicinity of headlands such as Cape Hopes Advance, Cape Digges, and Cape Weggs. Compass difficulties were resolved to some extent by flying a patrol route from one point to another by visual observations on days when there was good visibility and noting the compass readings for use at a later date when the weather would not be so favourable.

Squadron Leader Lawrence found all the difficulties of operating aircraft in an Arctic coastal area surmountable and was enthusiastic over the contribution that aviation could make to safe maritime operations in Hudson Strait. The first need was reliable charts and

(6) Squadron Leader Lawrence's report was addressed to the Director of Civil Government Air Operations. Mr. N. B. McLean, Officer-in-Charge, Hudson Strait Expedition of 1927-28, made a report to the Deputy Minister of Marine which was published by the King's Printer in 1929.

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the quickest and most accurate method of procuring these would be by the use of vertical aerial photography; the aerial survey could then be used to facilitate a new hydrographic survey. Aircraft would also find a very useful role, Squadron Leader Lawrence was convinced, in the direct reporting to ships using Hudson Strait of the presence of ice on their course, or, conversely, the direction of the most favourable areas of open water.

Mr. N. B. McLean in his report, after giving assurance of the practicability of safe navigation through the Strait if better charts and other aids were furnished, put the emphasis in his report on the provision of an ice breaker. He thought more ice observations should be made and recommended that they be made by the icebreaker.

Over forty years later, when most of the hopes of Squadron Leader Lawrence and Mr. McLean have been realized, the important part played by the Hudson Strait Expedition of 1927-28 in the development of Canada's Arctic can be appreciated. Its ice reconnaissance and weather observations established beyond doubt the practicability of Hudson Strait as a shipping route; the air operations were an important step towards the eventual aerial photographing of the Arctic by the RCAF, and the establishment of aerial ice patrols; and the experience gained in building bases on the Arctic coast was to prove most useful in planning the very much larger Arctic bases which were needed during the Second World War.

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Conversations with Air Vice-Marshal T. A. Lawrence, C.B., C.D., and Mr. J. R. O'Malley.

Bringing the first aircraft ashore at Nottingham Island.

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Apex Photos

The National Aviation Museum

by SYLVIA SEELEY

This article was prepared from material supplied by Mr. M. S. Kuhring, Interim Curator of the National Aviation Museum.

Photographs by Department of National Defence, unless credited.

A tetrahedral kite used by Dr. Alexander Graham Bell for his early experiments in flight.

CANADA is among the leading producers of aircraft in the world today, and it is therefore fitting that we should have a national aeronautical museum to show the steps by which this great industry has grown up. The idea, first promulgated by the late Air Vice-Marshal E. W. Stedman in 1932, has at last become a reality and is at present housed in a section of the spacious new passenger terminal building at Uplands Airport.

The first exhibit is a matter of pride to every Canadian for it is the replica of the *Silver Dart* which was actually flown at Baddeck on 23 February 1959 in honour of the fiftieth anniversary of J. A. D. McCurdy's memorable performance on 23 February 1909, the first successful flight by a heavier-than-air machine in the British Commonwealth, when he piloted his original *Silver Dart* over the frozen lakes at Bras d'Or. The replica is too big for the museum rooms, and is shown in a large glass rotunda outside, where one gets a feeling of lightness and airiness that puts one in tune for an exhibition of aerial things. The whole design is carried out in the right mood to keep the visitor aerially minded.

On entering the main building whose glass walls give straight onto the airfield, the visitor goes up some stairs, just as one might ascend the ramp to enter a plane. On going into the museum the first thing to catch the eye is the actual engine built for the original *Silver Dart* by Glenn Curtiss for Mr. McCurdy's biplane, a fine specimen of sound workmanship, perfectly efficient for its own time and place. Facing the engine is a show case with pictures of Alexander Graham Bell and other pioneers; these are briefly labelled but for those eager enquirers who want to know more, there is an ingenious system of earphones which pull out on a cord, by means of which one can listen to tape recordings by experts giving full information and explanations in either English or French; these talks are excellently spoken, and enjoyable to listen to in either language. The scope of instruction has been further enlarged by means of projectors which throw a detailed story on the back wall of some of the upright show cases, with push

button control. This is specially useful with small exhibits which would be dwarfed or obscured by too much labelling. In the case of larger displays which are made to demonstrate a mechanism or a principle, many of these, such as the wind tunnel, are working models, which can be switched on to run for a given time, and thus show the machine in action.

The problem of lighting is another question which every museum has to consider and in this case artificial light has been used throughout as it gives better control for exhibition by day or night; and by blanking off the windows one gains the advantage of extra wall space for display purposes. Where possible, sheets of plastic are used to diffuse the light from the fluorescent tubes. This gives an even light in every direction which is very successful.

Aviation is a science which is advancing so rapidly that new material must be shown as fast as it becomes available for an instructive exhibit. At the same time the logical sequence of events, discoveries and their results must be carefully maintained. To give true effect to this sequence, it was decided to arrange the material in a series of zones, emphasized by the use of a different background colour in the display cases of each period. The first zone is mainly of historic interest, showing the work of the early pioneers of aviation in Canada. It includes many photographs of exceptional interest and also such relics of experimental material as a section of Graham Bell's tetrahedral kite, and there is one case full of experimental models for propellers, and even a contraption with a bird's wings attached.

The next zone demonstrates the development of the piston-engined aeroplane from the earliest beginnings up to the present day. The evolution of aircraft type is shown by means of models, together with floats, skis, propellers, instruments and other accessories.

The third zone shows the value to aviation of such supporting services as air traffic control, airport construction, weather forecasting, mapping, search and rescue training, and other essential but less conspicuous services which make flight possible and practicable.

In the next, or "Operations" zone an attempt has been made to show the steps which led to the formation of air-lines from the days of the bush pilots onwards and there are displays of the activities of unscheduled, as well as major air-lines. The application of aviation to mining, agriculture and forestry is shown by models and ground plans which demonstrate the finding of large ore bodies underground, detected with the aid of magnetic instruments in the air; also the spraying of forest areas from the air to control insect pests, and the erection of observation posts to detect the outbreak of forest fires, and help control them. Then there is the air ambulance service which has done such heroic work in the isolated northern regions of Saskatchewan. Enterprise of this kind has always found Canadian aviation in the forefront. Full tribute is also paid to the ingenuity of the early "bush-pilots" whose daring flights led eventually to the establishment of regular air-lines; and with them came the "barnstormers" who brought their fragile machines to shows and exhibitions, and took adventurous visitors for air-borne rides, a valuable service in introducing the idea of air transport to the general public. Here we see a substitute hand crank, a propeller fashioned out of sleigh boards and moose glue, and many other

The National Aviation Museum was officially opened on 25 October, 1960 at Uplands by the Honourable Angus MacLean, Minister for Fisheries. He is here seen making the inaugural speech.

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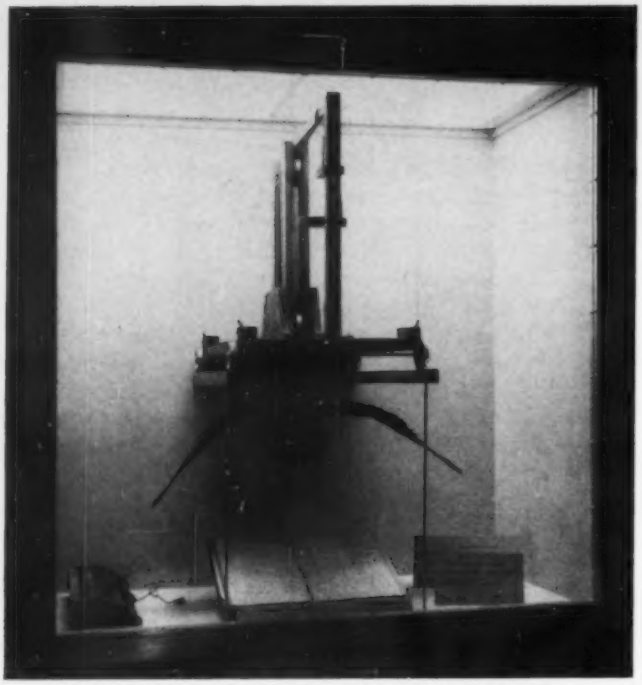
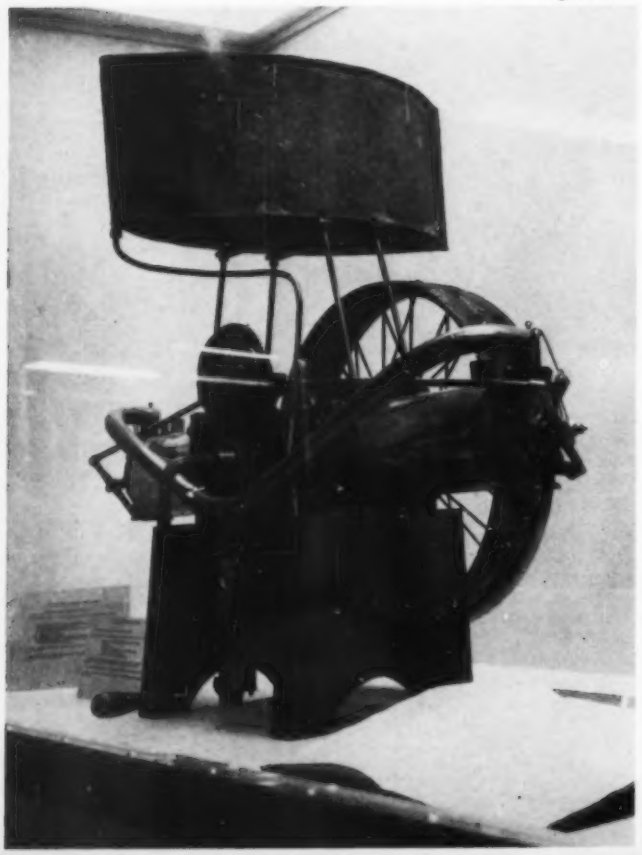


This panel shows a crude model constructed with a crow's wings and was used to measure the aerodynamic effects of flapping wings. The device was first used by Wallace R. Turnbull about 1909-1910.

reminders of the hard struggle by which the pioneers laboriously paved the way to modern efficiency.

Apex Photos.



The Duryea aero engine, introduced into Canada by W. R. Turnbull is a four-stroke, water-cooled, twin-cylinder opposed engine which was designed to deliver 16 H.P. with the weight not to exceed 7½ pounds per H.P.

The next division may be called the "Jet" zone and here we may see some of the accomplishments of the gas turbine engine, the rocket and tentative efforts towards space travel. By means of models a cross section of the gas turbine powered aircraft is shown. We see examples of the complex structural design; the Canadian guided missile known as the Velvet Glove; the Orenda Chinook jet engine; modern accessories and components; and a comparison of early fuel pumps with their counterparts of today.

In the next zone an attempt has been made to indicate the immense amount of research necessary in the development of modern aircraft. The tremendous increase in laboratory needs from the days of Turnbull, Graham Bell and their associates up to today's extensive and expensive establishments, is shown by means of photographs and also by a display of the latest tools such as a cosmic ray indicator and a photo-elastic stress indicator, besides many other recent tools which are shown in different parts of the museum.

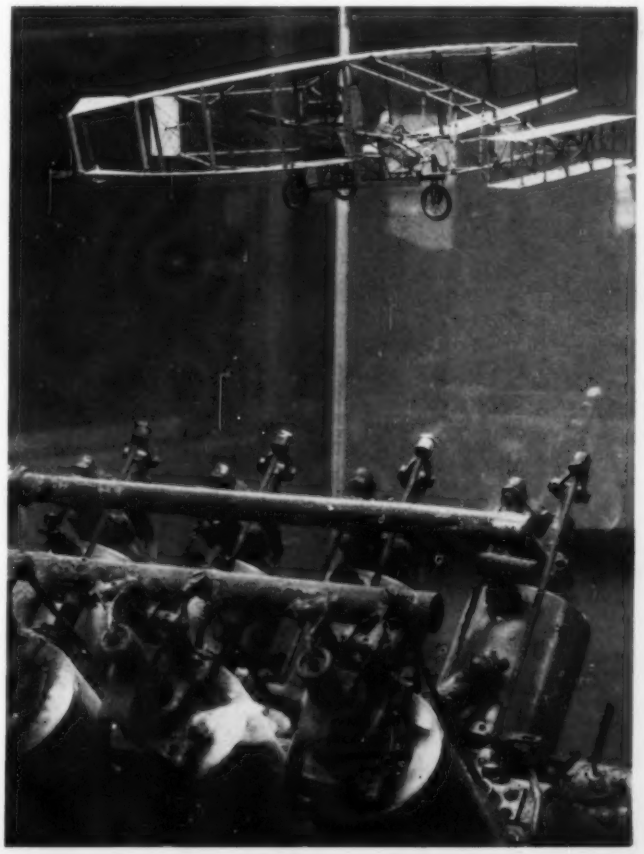
The production of modern aircraft in Canada would have been impossible but for the prodigious increase in Canadian manufacture. The constant demand for precision parts of unusual complexity was the incentive which led to the development of additional techniques, processes and materials needed to make the necessary parts for aeroplanes. The production of some of the items requires skills equal to those found anywhere in the world. Complex structures such as the fitting from the wing of a high speed fighter aircraft and the honeycomb bonding, prepared under heat and pressure, which binds the two metal skins are but instances of the amount of skilled effort needed to produce these parts. Sheet metal wing ribs have had to give way to ribs machined from the solid metal. The construction of sheet metal has also developed in a spectacular manner as may be seen by an example of the air duct junction which was used on a high speed fighter aeroplane.

The very highest degree of cleanliness as well as accuracy is essential in the manufacture of these advanced instruments; a directional compass is shown as an example together with other typical instruments. Liquid springs developed from the landing wheel of an early aeroplane are now being used in

other applications and these also are included in the display. Other features shown are the manufacture of hollow turbine blades for the Iroquois engine, filters, fuel gauges, hoses, components from the hydraulic system, a potentiometer and many other parts whose manufacture involves unusual skill.

It is now a generally accepted fact that all this amount of highly technical work can only be carried on at a very high cost. At the same time there is an appreciable return to the man in the street, which is often forgotten or unrecognized. Formerly it was conceded that consumer goods could be purchased more advantageously in the United States than in Canada. In recent years, owing to the tremendous increase in Canadian production in most directions, the situation has been very much altered. The influence of the Canadian aviation industry is one of the many important factors in the great upsurge of Canadian industry as a whole. The general rise has been phenomenal, and aviation in particular has required new techniques, new materials and new facilities, and with these essential developments, the manufacture of new or better consumer goods in Canada has also become possible. This is no mean contribution to the comfort and economy of Canadian life, and in order to make the position clear, the final zone is devoted to Aviation's Contribution to Canada, and here we see how the results of aviation research work have in some instances been applied to every day domestic needs. For example, anodizing of light metal was largely developed as a method of protecting that metal in aircraft from corrosion. The process has been applied to trade and has evolved into many attractive surface finishes which are commonly used for store fronts, radiator grills, ash trays and many other objects in general use. Another example is seen in disc brakes, which have been developed to the highest degree of reliability for aircraft use. As a result better disc brakes are now available for private automobiles. Yet another adaptation is to be seen in the "lost wax" or investment casting process which has been used by sculptors for very many years. This process was introduced into Canada for the production of high temperature-resisting parts for aircraft. It has now been directed towards the production of parts for the consumer goods market, and is used in the oil industry, the paper industry, in the manufacture of sewing-machines and suchlike tools.

It is one of the functions of this museum to show by suitable displays how greatly Canadian industry in general has benefited by the researches made in the aviation industry, and where possible, to give an outline of the processes by which this progress has been achieved. But people who are interested in aviation want to see the aeroplane in being, to watch them take off and land, and in order to meet these wishes the museum has provided an observation room, fitted with the regulation aircraft seats, where visitors can sit and rest while enjoying a full view of all the busy comings and goings out on the airfield. This makes a delightful interlude after walking round the galleries. Another very important function of the museum is to secure the interest of all children. The aviation of tomorrow is in the hands of the children of today, and we must pass on to them our present skills and ideas so that progress shall be maintained and improvements made. The museum therefore has provided a children's section, where spark plug demonstrations



The original Silver Dart *engine with a model of the aircraft suspended above it.*

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One room in the Museum shows models of earlier Canadian aircraft with a collection of associated full scale reciprocating engines, propellers, skis, pontoons and other aircraft equipment. R.C.A.F.

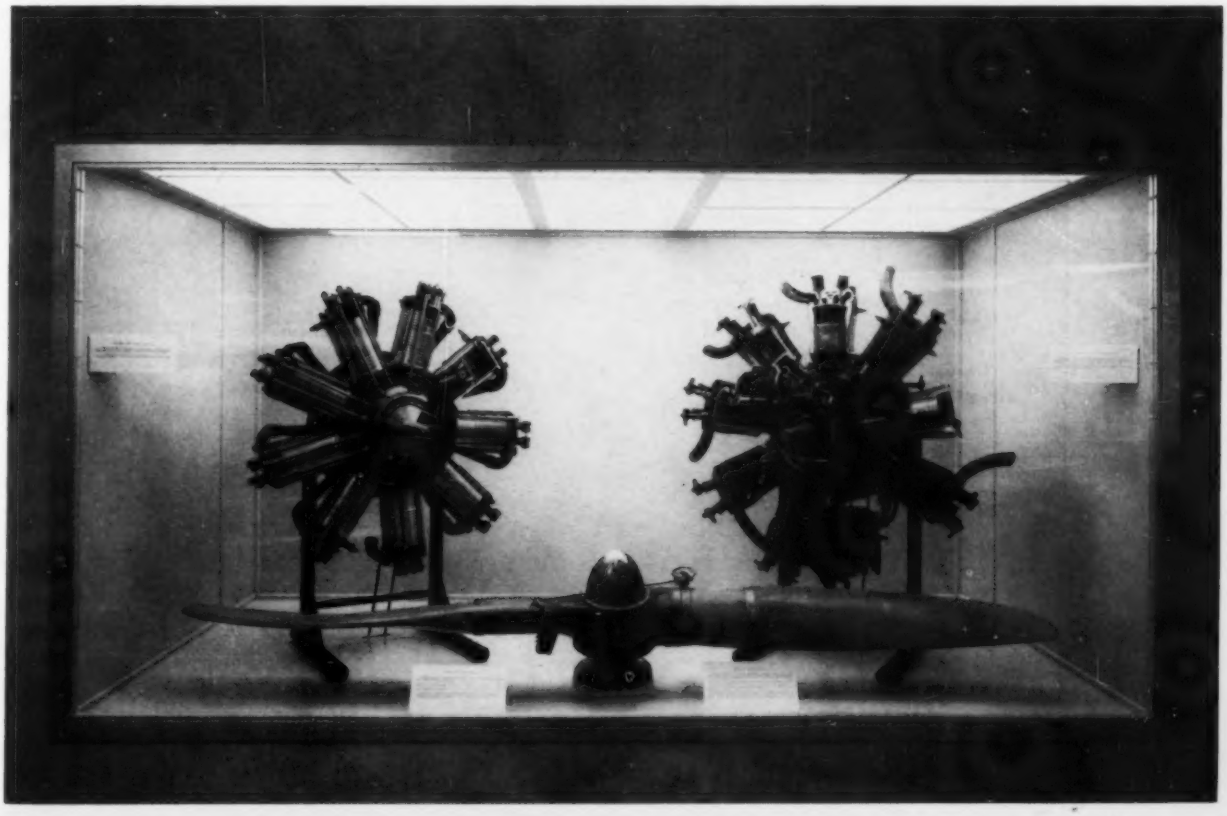
This display shows pictorially some of the contributions to general experimental work made by Dr. Alexander Graham Bell for the Aerial Experiment Association.

will be given, and hydraulic jacks, a thermocouple, a stroboscope and an aerodynamic water table will be shown. Then for the very young children there is a small airport, equipped with model aeroplanes, that the children may play with. If in this children's section some future Graham Bell, Turnbull, Baldwin, or McCurdy can be inspired or even startled into finding his right place in aviation, then all the cost and the effort which has been expended on the National Aviation Museum will have been abundantly justified.

At this present and initial stage, the Museum is far from perfect. Those who have built it are aware of its weaknesses and its many borrowed ideas, but it is unlikely that any such museum has met with so much support from all sides and it will need a steady continuation of that support to maintain its service for all the people of Canada.

On first entering the Museum the visitor sees a wide variety of models of experimental parts belonging to the pioneer days of aviation in Canada.

This shows the cutaway rotary and radial engines, both of which may be operated by the visitor with the aid of a push button.



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"THE FIRST SNOW" or "CANADIA

by Cornelius Krieghoff, 18

This painting belongs to Krieghoff's best and most prolific period, having been done about 1856. It is representative of a large farms, and way of life in the mid-nineteenth century. The artist left about seven hundred known works which constitute an invalu The high hill to the left of this work is believed to be St. Ann's Mountain, below Quebec.

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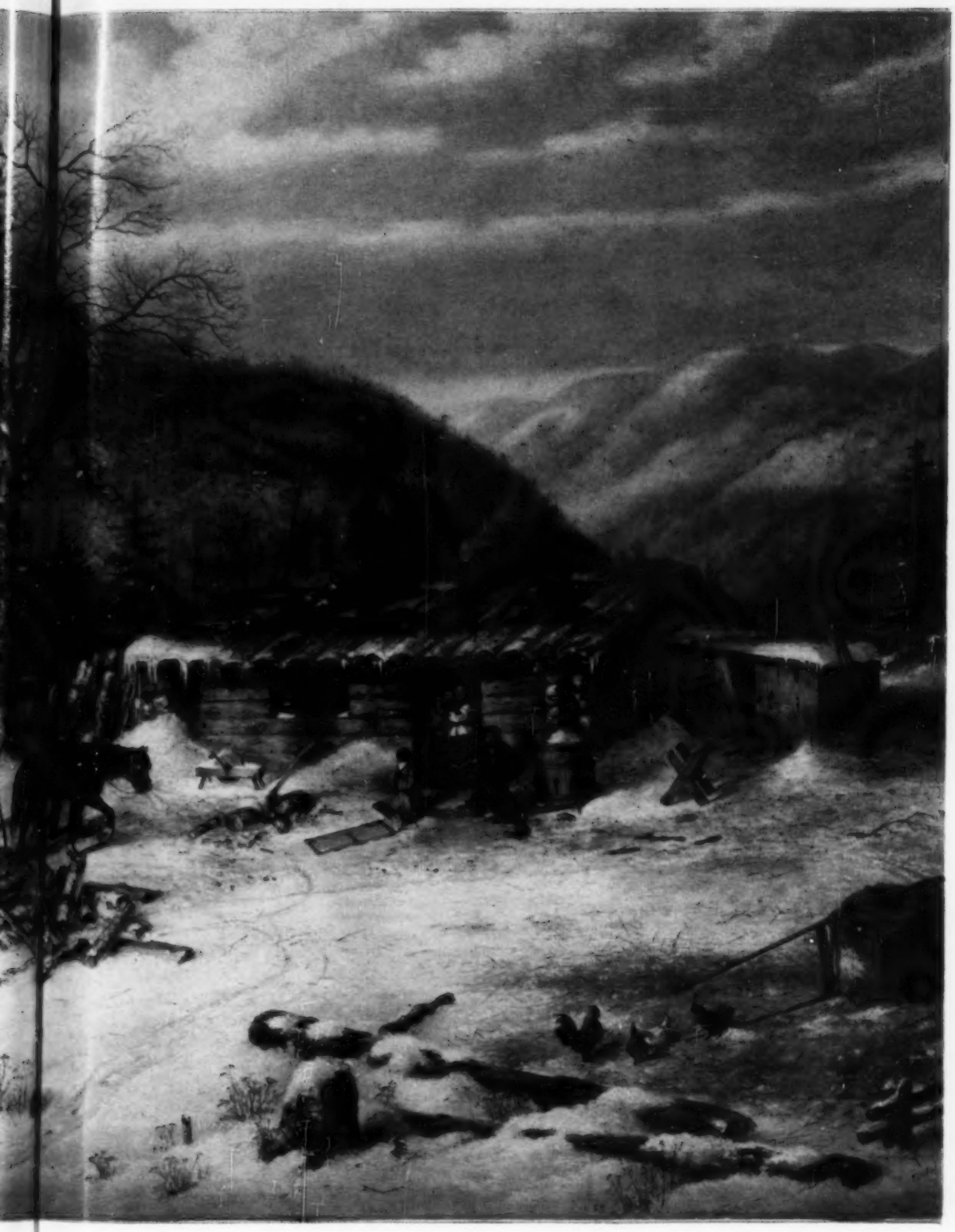

"... or "CANADIAN HOMESTEAD"

...ius Krieghoff, 1815-1872

...ntative of a large number of paintings in which Krieghoff portrayed with meticulous detail the habitant settlers' homesteads, ...constitute an invaluable record of early Canadian Life.

By courtesy of the Gazette Printing Company (Limited)

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The view from Keel towards the Menawn Cliffs. The large dark heaps are stack of dried peat or turf used for fuel on the island.

Achill Island—Hunting Ground of the Big Fish

by P. W. F. GRIBBON

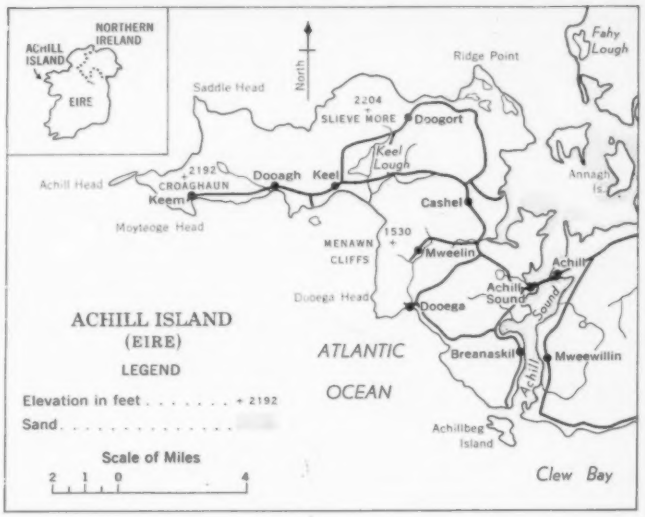
Photographs by the Irish Tourist Board except where credited.

As THE restless Atlantic Ocean foams ceaselessly against the western shores of Ireland, warm soft winds, laden with moisture after crossing thousands of miles of open sea, meet the rugged coastline of cliff, bay and island. Nowhere is the resultant pattern of cloud, sun and sea met to greater advantage than on the largest Irish island of Achill, being just off the Mayo coastline in the province of Connaught. An ever changing array of colour, light and shade sweeps across the bleak, barren peat bogs, up and over the hillsides, accentuating now the small vivid green fields, next moment the whitewashed cottages along the shore.

The same natural beauty that has served as a source of aesthetic inspiration to Irish painters, such as Paul Henry, brings now to this island an increasing tourist trade. Life, however, for the hardy Achill men has never been easy: an intractable soil yields few crops, while good grazing for cattle and sheep is limited. Emigration to the larger cities, the United States and now to England drains the surplus population and helps to maintain a balanced economy. Since World War II, a new and profitable industry has been developed, bringing a welcomed increase in income to the fishing community. The initiative and enterprise of the islanders has resulted in commercial exploitation of the migratory shoals of Basking Shark.

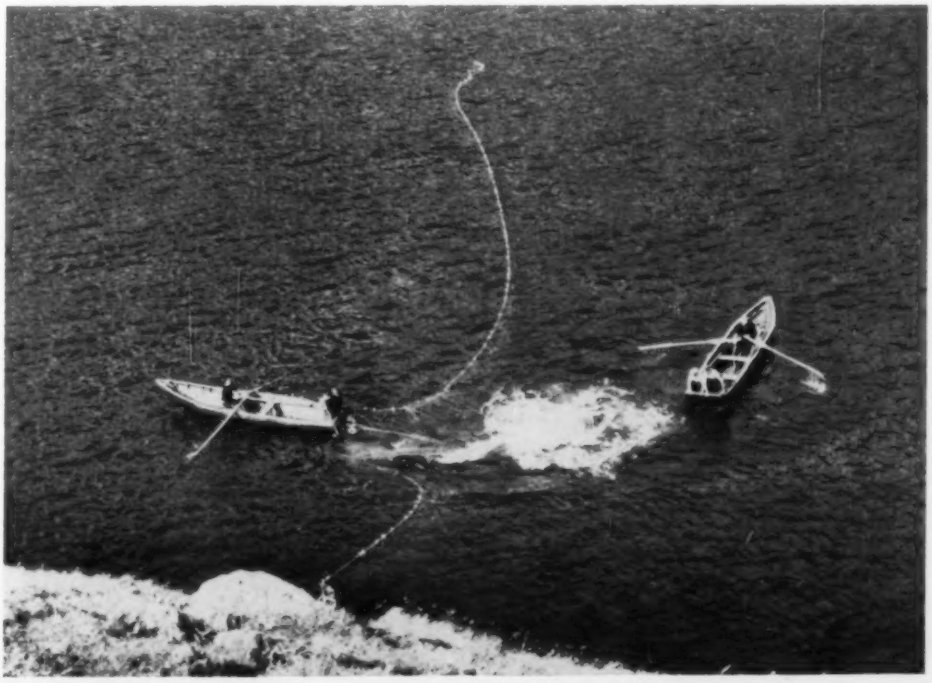
The Basking shark (*Selache maxima*) is the most common of the dozen and a half members of the shark family found around the British Isles. The fully grown adult Basking shark attains a length of more than thirty feet, making it the largest fish in the world.

Although its jaws could engulf a sheep, this shark is remarkably harmless, being totally uninterested in devouring other fish, like most sharks do. Instead, it feeds on the tiny cousins of the crab, the copepods, that swarm near the ocean surface. This plankton food supply reaches its seasonal maximum off the west coast in May. By instinct, the great "sun-fish", the Basking shark, follows its food up the ancient routes, as yet scientifically uncharted. In mid-April they appear in ones and twos, and reach maximum numbers at the end of May. At this latter period, the oldest representatives of the species swim up the coast. Huge indolent creatures, without fear or guile, they loll at the surface. The high, triangular dorsal fins cut slowly through the calm waters and meanwhile, unseen, the great jaws, each with seven rows of minute conical teeth, open, scoop and gulp ten thousand copepods. As each mouthful strains out through the gill openings, the copepods are caught in the comb-like structure of the bony gill-rakers. Until mid-July, the younger fish follow respectfully after their elders, when, without trace, the whole nomadic tribe vanishes for another year.



non-existent, the cross-section semicircular. In these slim fragile craft, the Achill island men hunt the shark, and in their care these extraordinarily seaworthy boats can dance like corks over the powerful Atlantic swell. For six days a week during the twelve weeks of the hunting season, from dawn to dusk, the fishermen wait for the sharks to enter the nets.

It is of interest to compare the grim, prolonged battle of man against fish of a century ago with the current methodical fishing technique. Jonathan Couch, F.L.S., in his *History*



Making the kill in Keem Bay. The shark struggles wildly after being harpooned.

A catch of sharks on the slipway, prior to being cut up.

of the Fishes of the British Isles, published in 1854, quotes a detailed account ". . . a day's sail out of sight of land, their large dorsal fin is seen as it rises three or four feet out of the water, while the sunfish lie motionless, basking in the sun. They are easily approached, and with great caution, harpooned, by striking near the fin, as they will stave in the boat with a blow of their tail. The fish rushes to the bottom, rolling and rubbing to free the harpoon . . . Allow an hour to tire before hauling upon the two hundred fathom line and coil up slack . . . Another rush, and so on for eight or nine hours till they get him to come to the surface . . . then more harpoons . . . Haul along the vessel's side, put a jowl rope and the bight of a hawser round his head . . . The liver is removed for its oil, and the rest of the fish cast adrift." Later in 1904, the naturalist Aflalo was pleased to write that such an industry was in keeping with the ethics of a generation that has not scrupled to exterminate the bison for its tongue and the African elephant for its teeth.

Cormorants bob contentedly on the shimmering surface of a blue-green sea. Disappearing underwater, their diffuse black forms weave swiftly after small fish, silhouetted against the sandy floor of Keem Bay. Big pollack break the surface in a quick splash of water as they hunt in the dark brown seaweed fringe under the cliffs of Moyteoge Head. Sheep graze the rich green pasture around the abandoned houses under the sheer bulk of Croaghaun mountain rearing 2100 ft. above the bay. Herring gulls paddle with dignity on the foreshore. A thin curl of blue smoke spirals from the ramshackle hut by the brown riverlet. Sturdy weatherbeaten fishermen sit in the sun sorting the light nets, repairing the rents. A curragh swirls on the ebb-tide watched by an inverted row of its brothers, drying above the high tide reach. Five great nets are out in neat array from the shadows of the cliff watched by drifting curraghs, each with their 3-man crew. A pontoon

Keel harbour, looking west. The shark-processing plant is on the right.
P. W. F. Gribbon

float heels drunkenly beside the large, diesel-powered, modern fishing smack.

A small triangle of black fin cleaves the waves. A short whistle alerts the boats. Quickly a curragh, propelled by narrow blades, stations itself at the outermost end of the first net. Unhurriedly, the tell-tale shadow rounds the bay and heads towards the trap. Instinctively, the great fish turns and swims out parallel to the barrier. Standing motionless in the stern, the spearman waits poised. Oars dip, the curragh responds instantly. Warily the shark turns, straight into the net. Gone is the tranquillity of the Achill bay: the massive body rears up, its crescent tail flailing, its fin twisting, turning. The boat moves in. The spearman strikes unerringly, once, twice, in the back, between the gills and dorsal fin. Within seconds, in the foam and blood, the shark is paralysed and dying. Through the mouth and gills, the towing rope is threaded, and the dead shark is quickly moved to the pontoon float.

Another net bobs, and a shark rises, fighting for freedom. The sharp blade stabs, but the shark's tail thrashes upward under the curragh stern. The flimsy craft pitches precariously, and the spearman, clutching the gunwale, drops his weapon. Another curragh arrives to assist, but the shark is gone.

Back in the little harbour at Keel, gulls cry as they wheel over the returning smack. A dozen or more sharks wallow ignominiously on the tow line. Behind the harbour breakwater, this catch joins the morass of carcasses. It is not easy to manoeuvre the four-ton fish up the stone slipway, but, once accomplished, it is "diced" with amazing adroitness. The abrasive shark skin, that can lacerate a hand or wear away a hull timber, offers little resistance to the cutting scythe blade, honed to razor-edged sharpness. Men, wielding long hooks, sling the twenty-pound lumps of white flesh onto the loading embankment. There it awaits transport to the fishmeal factories in Ballinsloe, County Galway, or Cavan. The liver is stoked into the steaming, stinking oil extractor to be digested on the spot. Nothing is wasted, but the gulls grow sleek and indolent.

The last fragments of daylight outline the distant hills. Imperturbable, the gorged gulls mutter to each other, as they dip and pitch on the Atlantic swell. Underneath, the great sharks swim onwards, as they have done for centuries into the unknown.

Against the background of the Menawn Cliffs, a catch of sharks is brought into Keel harbour.

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A sketch of the ruins of Fort Senneville, done by Philip J. Bainbrigge in 1839. These ruins still stand on a private estate at Senneville. Public Archives of Canada

"Vaudreuil and its environs," drawn by E. Haberer. This drawing was published in the Canadian Illustrated News, *23 October 1880.* Public Archives of Canada

The Lake of the Two Mountains

by W. E. GREENING

Photographs by the Quebec Publicity Bureau except where credited.

OF THE waterways of Eastern Canada, few have more interesting associations with many phases of the nation's story than the Lake of the Two Mountains. This body of water is located at the junction of two of the largest rivers of this region — the St. Lawrence and the Ottawa — and many stirring events in the history of the Province of Quebec have taken place along its lovely shores.

The Lake of the Two Mountains assumed a strategic importance in connection with exploration and the development of the fur trade soon after the coming of the French to Canada in the early seventeenth century because it formed the starting point of the long Ottawa waterway which extended westwards into the heart of the continent. Through these waters during these years passed the heroic French explorers and traders and Catholic missionaries on their journeys by canoe into the unknown wilderness during the course of which they were to build a mighty and far-flung empire for France in North America.

This lake was on one of the routes used by the Indian tribes of this region of the continent, the Algonquins, the Nipissings and the Iroquois, on their frequent military and trading expeditions. The great French explorer, Samuel de Champlain, went up this lake on his two expeditions up the Ottawa in 1613 and 1615, the results of which were to widen greatly the European geographical knowledge of this region of North America.

It was in the period after the founding of the little settlement of Ville Marie on Montreal Island in 1642 by Paul de Chomedey, Sieur de Maisonneuve and his associates that the first signs of European civilization began to appear along the shores of this lake. The rapids at the west end of this lake where the waters of the Ottawa flow into those of Lac Saint-Louis seemed to be a very convenient point for trading with the local Indians who came down the Ottawa, their canoes laden with furs, every spring and summer. Therefore, in the year 1670, François-Marie Perrot, who had been made Governor of Ville Marie by the Sulpician Order in the preceding year, set up a small trading post on the island there which still bears his name, and during the next few years several other French traders from Ville Marie followed his example. But Perrot was an unscrupulous individual. In a completely illegal manner he debauched the local Indians with "eau-de-vie" in order to get their furs at low prices and his activities in this connection became so notorious that in 1674 Frontenac, the Governor of New France, deprived him of the possession of this post and had him tried before the Superior Council of New France. He was afterwards sent to Paris and was imprisoned in the Bastille for a time.

During these years, there was a lull in the long continued warfare between the tribes of the Iroquois Confederacy and the French in Canada and a few settlers from Ville Marie took up land in this area both along the shores of Lac Saint-Louis and the Lake of the Two Mountains. During this same period, the Sulpician Order which at this time held title to the whole of Montreal Island, granted a fief on the shore of the Lake of the Two Mountains to Captain Michel-Sidrac du Gué, Sieur de Boisbriant. He had come out to Canada several years before as an officer in the Carignan-Salières Regiment and he had decided to settle in the vicinity of Ville Marie. He set up a trading post by the shores of the lake there which he operated for several years and then, in 1679, he sold this property to two of the prominent figures of this era in New France, Charles Le Moyne and Jacques le Ber. Le Moyne was a member of a family which was to play a leading role in the affairs of the colony during the next few decades and Le Ber was one of the leading merchants of Ville Marie. However, when Le Moyne died in 1685, Le Ber bought Madame Le Moyne's share of the property and became the sole owner. In the meantime, the raids of the Iroquois tribes on Montreal Island had begun again and in 1686 Le Ber began to build defences against their incursions along the shores of the lake in the form of a fortified windmill.

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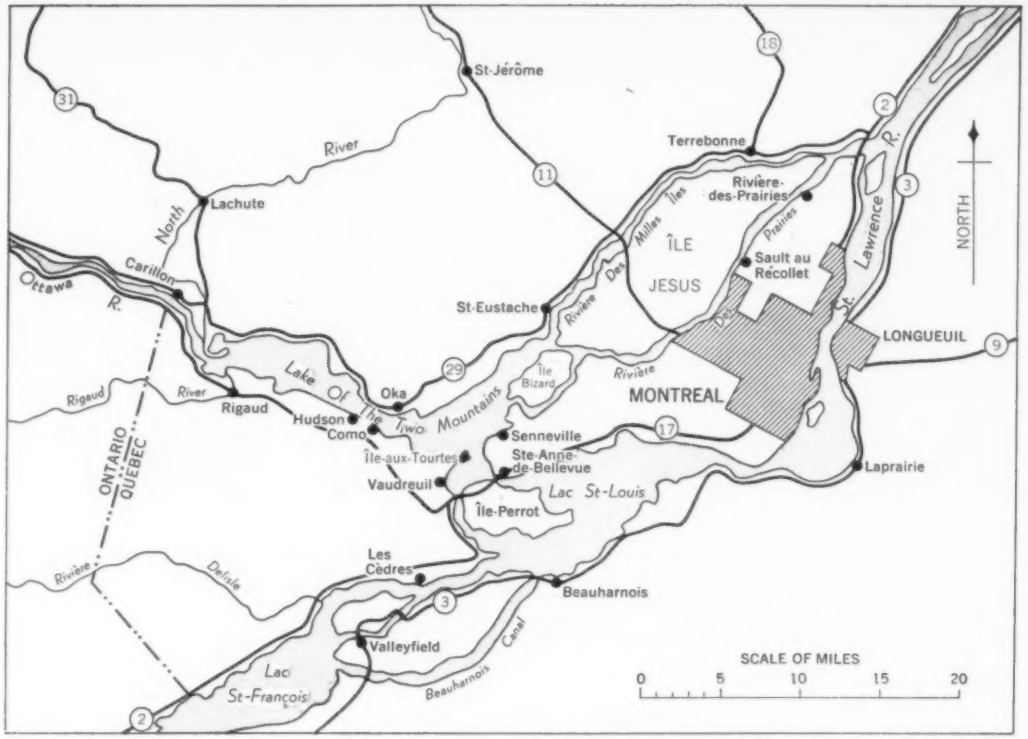
The need of these measures is shown by the fact that in the year 1687 a group of Iroquois conducted a raid on Ville Marie by way of the Lake of the Two Mountains and assaulted the windmill. But when attacked, Le Ber was able to put up a successful defence and the Iroquois retreated down the lake having taken only one prisoner. In 1691, the Iroquois staged another raid on the Lake of the Two Mountains and this time Le Ber drove them off again although the savages managed to set fire to his mill.

Four months later, the French military officials in Ville Marie decided to build a fort on the site of the mill which would be strong enough to withstand the fiercest Iroquois attacks. Thus, Fort Senneville was erected and became an important link in the chain of the defences of New France at this period. Unlike most of these early French forts in Canada, it was built of stone and not of wood and had thick walls in which several pieces of light artillery were mounted. Apparently, this stronghold served its purpose well, since there were few further serious Iroquois raids in this region of the colony during the succeeding decade. Towards the end of the century, Le Ber built for himself a manor house near the fort to which he gave the name of Senneville in honour of the town of his birth in northern France.

In the meantime, the French Crown began extending the seigneurial system into this region of the colony. Philippe de Rigaud, the Marquis de Vaudreuil, who became Governor of New France in 1703, obtained from the French Crown at this period two large seigneuries, Vaudreuil and Rigaud, which extended along the south shore of the lake from its junction with the Saint Lawrence westwards to a point near the present-day boundary between the provinces of Ontario and Quebec. In the year 1702, this same individual had acquired possession of a small island in the lake, the Île-aux-Tourtes, where the Sulpician Order set up a mission for the local Indians and a small fort was also erected.

During this period the Sulpician Order which had another mission for the Indians at the Sault au Récollet on the Rivière des Prairies, decided to transfer it further westward in order to escape the corrupting influence of nearby Montreal. In 1717, they obtained a large grant of land along the north shore of the Lake of the Two Mountains, La Seigneurie du Lac des Deux Montagnes, and they decided to build a mission at the foot of a high hill which is still a local land-

An artist's impression of the village of Oka, as it was in the middle of the nineteenth century.
Public Archives of Canada



mark. Eventually, the mission for the Nipissing Indians was also transferred there from the nearby Île-aux-Tourtes.

Around the year 1721, a small chapel, a presbytery and a wooden fort were erected at this point on the shore of the lake and this settlement received the name of Oka. The Indians at the mission at this period were mostly Hurons, some of the remnants of this nation which had been almost completely wiped out by the Iroquois in the preceding century, and there were also Algonquins, Nipissings, and Iroquois. A short time before the end of the French regime in Canada, Monsieur Fleury d'Eschambault received a concession from the French Governor to set up a trading post near the mission here. After 1763, this post was eventually taken over and operated by the Northwest Company in Montreal.

In the meantime, on the death of Jacques Le Ber in 1706, the fort and the manor house at Senneville passed into the possession of his son Jacques Le Ber the Second and the property remained in the hands of this family until 1763 when they returned to France. During the next few years this estate passed through various hands and finally became the property of the Sieur Testard de Montigny, in 1776, at the time of the American invasion of Canada. After the American occupation of Montreal in the fall of 1775 by the armies of General Montgomery, a considerable amount of skirmishing took place between the American and the British forces in the region of the Lake of the Two Mountains. The British, in the spring of 1776, succeeded in capturing a large number of American prisoners in an engagement at Les Cèdres, on the St. Lawrence River, and some of them were brought to the fort of Senneville for safe-keeping. Benedict Arnold, who at this time was commander of the American forces in Montreal, led a party of troops up Lac Saint-Louis to the west end of Montreal Island with the aim of attacking the British there. Captain Forester, who was in charge of British military operations in this region, on receiving word of Arnold's approach, took the prisoners from the fort at Senneville to

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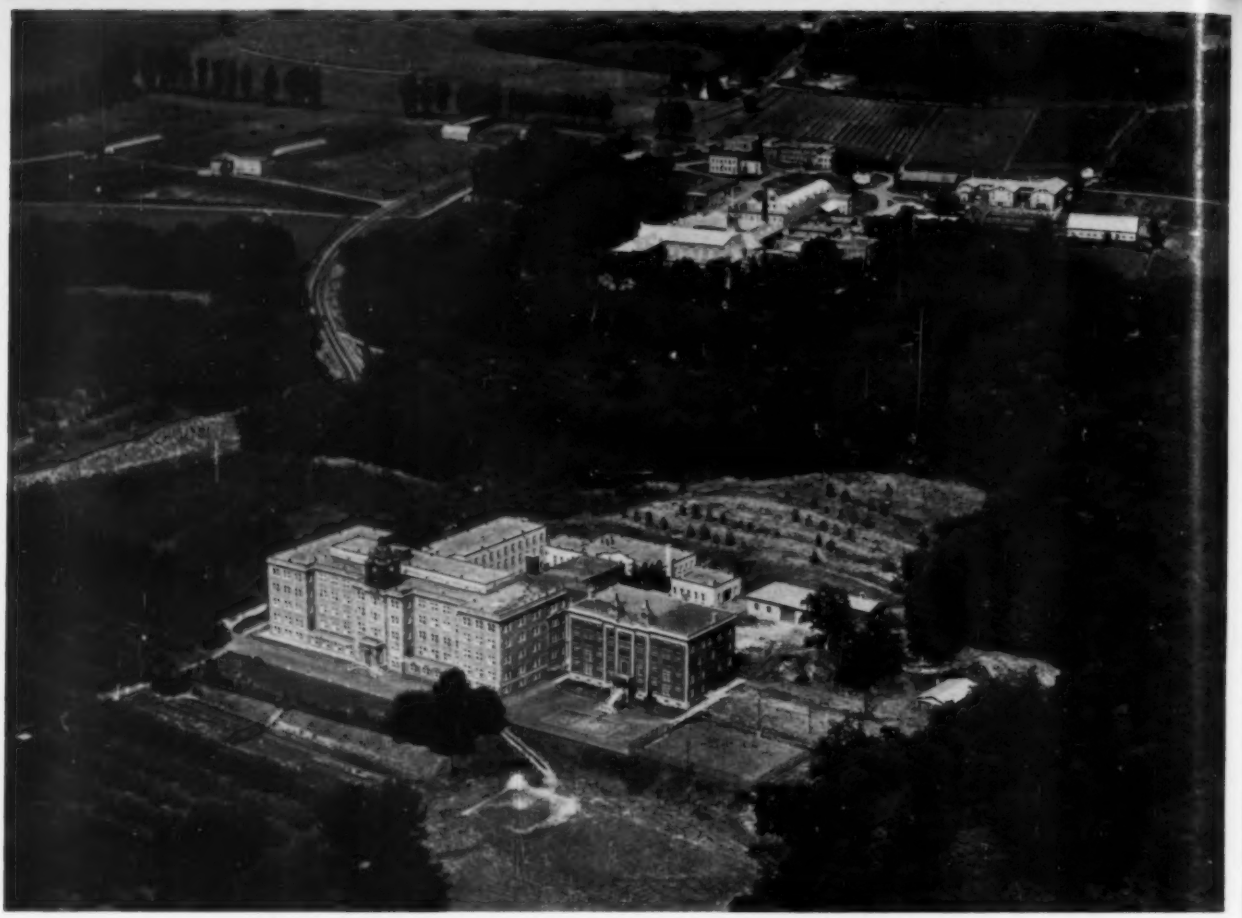

The Agricultural Institute at Oka. The Trappist monastery lies just beyond.

the nearby Île-aux-Tourtes and when Arnold and his men reached the fort, they found it deserted. The Americans then rowed across the lake and had a skirmish with the British in Vaudreuil Bay in which the latter were victorious. Arnold then crossed the lake again and spent the night at the fort at Senneville. The next day he burned it to the ground and returned to Montreal.

In the meantime, during the eighteenth century there had been little settlement in the seigneuries of Vaudreuil and Rigaud. After the death of Philippe de Rigaud de Vaudreuil in 1725 they passed into the possession of his son Pierre de Rigaud, Marquis de Vaudreuil, the last French Governor of Canada, who surrendered Montreal to the English in 1760. After his return to France in 1771, he sold these extensive estates to a member of another important French-Canadian family, the Marquis Michel Chartier de Lotbinière, a military engineer who had been responsible for the construction of the French fort at Carillon, or Ticonderoga, on Lake Champlain during the Seven Years War. Later his son, Michel Alain de Lotbinière, took over the management of these properties which he inherited from his father. This individual was an important political figure in the Lower Canada of this period. He was Speaker of the Legislative Assembly between 1794 and 1796 and was later appointed a Member of the Legislative Council. During the course of his long life (he died in 1822), he did much to develop these two seigneuries along the south shore of the lake. By the year 1778 there were over one hundred French-speaking settlers in the two seigneuries, chiefly in the region around the village of Vaudreuil, and by the year 1800 English-speaking settlers had begun to take up land in this region of Lower Canada. During the

following decades the communities of Hudson, Como and Rigaud were founded along the south shore of the lake. The western end of the seigneurie of Rigaud formed part of the boundary between the provinces of Upper and Lower Canada when these two administrative divisions were formed in 1791.

Early in the nineteenth century important economic changes took place in this region of Canada. The fur trade down the Ottawa and through the Lake of the Two Mountains after two centuries gradually came to an end after the amalgamation of the rival Hudson's Bay Company and the Northwest Company in 1821. But the trading post at Oka which had been set up in the preceding century, was operated by the Hudson's Bay Company until the middle of the century. During this period, as the lumber industry gradually spread westwards up the Ottawa Valley, great rafts of logs came down the lake every summer on their way from the lumber camps on the Ottawa and its tributaries, down the St. Lawrence to Quebec City for shipment to markets in the United Kingdom.

At the same time, with the advent of steam navigation in Eastern Canada, this lake became an important link in the transportation network of this period. In the year 1826, a steamboat service began between Lachine up Lac Saint-Louis and then through the Lake of the Two Mountains to Carillon on the Long Sault Rapids of the Ottawa at its western end. In the following decade, through service was started between Montreal and Bytown over this route. Passengers would take the steamer to Carillon, then go several miles by coach around the rapids in the Ottawa to Grenville. Here they would board another steamer which would take them up the Ottawa to the pioneer lumber town at the Falls of the Chaudière which was later to become the national capital of Canada.

During the Rebellion of 1837-38, this region of Lower Canada was one of the centres of the agitation of the French Canadian Reform Group, led by Louis Joseph Papineau and Dr. Wolfred Nelson against the autocratic rule of the Château Clique in Montreal and Quebec City. The patriots during 1836 and 1837 organized meetings in many of the towns and the villages of this area in protests against the many abuses in the administration of the province at this time. When the insurrection actually broke out in the province in November 1837, two of the most important patriotic leaders in this region were Amury Girod and Dr. Joseph Chénier of Saint-Eustache, which is located on the Rivière des Mille-Iles, a short distance to the east of the Lake of the Two Mountains. When the news of the victory of the patriots at the village of Saint-Denis on the Richelieu reached this area, these two men with the aid of local volunteers, were to get military control of this region for almost two weeks, until a British army approached from Montreal under the command of Sir John Colborne. A battle took place at Saint-Eustache during the course of which the patriots were put to flight and the British burned the village to the ground. This marked the end of the organized resistance of patriots in the province.

During the first half of the nineteenth century, the Sulpician Order at Oka had considerable trouble with a group of local Indians who had been converted to the Protestant

A small pilgrimage chapel at Oka

The interior of the parish church at Vaudreuil. The church was built in 1787.

The famous Trappist monastery at Oka.

Originally built in 1783, the parish church at St-Eustache suffered much damage in the 1837 rebellion. The facade was rebuilt in 1841 by Joseph Robillard.

The original seigneurial house of Argenteuil, now the property of Les Soeurs des Petites Filles de Saint-Joseph.

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faith and who made claims to some of the lands belonging to the Order in the region along the lake. There was prolongued litigation over this matter and finally, in the year 1875, a group of Iroquois tried to set fire to the Sulpician seminary at Oka and the presbytery and chapel were burned to the ground. The Sulpicians, a short time later, decided to transfer this mission to the Muskoka region in Ontario. In 1881, members of the Trappist Order who came to Canada from France during these years, purchased a large portion of the lands of the Sulpicians along the lake and made this community the centre of their activities in Canada. They later founded an agricultural institute there which became affiliated with Laval University in Quebec City and which became one of the leading institutions of agricultural education in the province. They developed their cheese, which has become world-famous for its delicious and distinctive flavour. In the year 1959, the Trappist Order decided to give up the running of this school and devote themselves entirely to farming and meditation. A new agricultural college is being built by the Quebec Government at the present time.

During the latter part of the nineteenth century, many wealthy and prominent residents of nearby Montreal built for themselves handsome country and summer homes along the shores of the lake, both on Montreal Island and along the south shore in the region between Vaudreuil and Rigaud. Today, some relics of their colourful and vivid past are still preserved in the communities along the shores of this lake. At Senneville, on Montreal Island, the ruins of the stone fort which was built at the end of the seventeenth century still stand near the shore of the lake, on a private estate. An open courtyard is partially surrounded by crumbling walls of stone. The foundations of the manor house, built here by Jacques Le Ber, still remain, together with some of the other walls. Nearby Sainte-Anne-de-Bellevue today is the home of Macdonald College, an affiliate of McGill University and one of the leading institutions of agricultural education in Canada; a training school for the teachers in the Protestant schools of the province is also located here.

On the Ile-Perrot which separates Sainte-Anne-de-Bellevue from Vaudreuil, stands a catholic parish church with an attractive situation on the shore of the river which dates from the later eighteenth century and whose interior is adorned with some fine decorative work.

In Vaudreuil, close to the river, stands a very picturesque old house which was built near the end of the eighteenth century by a German named Jean Joseph Trestler, who was engaged in fur trading on the Lake of the Two Mountains at this time. This is an excellent example of French Canadian domestic architecture of this period.

Also in the town is a museum which was created through the initiative of some local residents and which houses a collection of interesting objects, furniture, farm implements, etc., connected with the history of this region of the province.

The Catholic parish church in Vaudreuil was also built towards the end of the eighteenth century. Its interior contains some beautiful historic French-Canadian wood carving and sculpture and some notable examples of the work of Philippe Liebert, one of the best French-Canadian wood sculptors of this era. In the Church here one can still see the tombs of members of the de Lotbinière and the Harwood families and the de Lotbinière seigneurial pew.

A few miles to the west, along the south shore of the lake, in the charming suburban and residential community of Hudson is located an Anglican Church which is one of the older Protestant places of worship in this region of the Province of Quebec. It was completed in the year 1842 and has a lovely situation shaded by tall trees, overlooking the waters of the lake.

Still further to the west, along the south shore of the lake, the town of Rigaud close to the Quebec Ontario boundary has a picturesque situation at the foot of a high rocky hill from the top of which a magnificent panorama of this whole section of the Ottawa Valley can be obtained. On the slopes of this hill stands the Collège Bourget, a *collège classique* run by the Clercs de Saint-Viateur. There is a chapel here which is a fine example of modern French-Canadian architecture and where are to be seen a series of beautiful bronze plaques of the Road to Calvary which were done by the Quebec City craftsman, Albert Gilles.

On the north shore of the lake, some traces of a varied past still remain in the village of Oka. On the slopes of the high hill behind the Seminary stands a series of small stone chapels which were built between the years 1739 and 1749 by the Sulpician Order. They still line a Pilgrims Way which rises to the top of the hill. They are the sole surviving mementos of the missionary labours of the Sulpician Order in this region of Canada at this period. In the village of Oka, by the shores of the lake, stands a stone house which was originally built by Pierre d'Ailleboust D'Argenteuil, to whom the seigneurie of Argenteuil was originally granted in the eighteenth century and which eventually came into the possession of the Sulpicians. Today it is the property of the Catholic Order of Les Soeurs des Petites Filles de Saint-Joseph.

Some distance to the east of Oka at Saint-Eustache, the stone parish church by the river which was built towards the end of the eighteenth century, and which was the scene of fighting during the battle there in December 1837, still stands and one can see embedded in its massive walls bullets which were fired by the British troops and the patriots during this encounter.

In spite of the fact that it is close to the largest metropolitan area in Canada, the region of the Lake of the Two Mountains still preserves much of its untroubled and peaceful charm and its distinctive atmosphere.

The three pilgrimage chapels built by the Sulpician Order at Oka.

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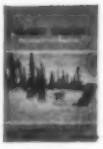

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EDITOR'S NOTE-BOOK

Wing Commander R. V. Manning D.F.C., C.D., (*The Hudson Strait Expedition 1927-8*) succeeded Wing Commander F. H. Hitchins as Air Historian on the latter's retirement in the spring of 1960. Wing Commander Manning graduated from the University of British Columbia in 1937, joined the R.C.A.F. in 1940, and served overseas for three years on torpedo bomber squadrons in the United Kingdom, Middle East, India, and Ceylon. Since the war he has held a number of command and staff positions, the last being on the staff at the North American Air Defence Command Headquarters at Colorado Springs, U.S.A., before assuming his present duties.

* * *

P. W. F. Gribbon (*Achill Island—Hunting Ground of the Big Fish*) is a research physicist who obtained his Ph.D. at Queen's University in Belfast, Northern Ireland. He came to Canada and in 1956 joined the staff at the University of British Columbia. Dr. Gribbon is at present engaged in low temperature research at the Royal Military College, Kingston, Ontario. One of his major interests is mountaineering, and during the summer of 1960, went on a two-man expedition to the Cumberland Peninsula of Baffin Island.

* * *

W. E. Greening (*The Lake of The Two Mountains*) is a free-lance writer who has made a special study of the Province of Quebec. He has had numerous articles on the historical and cultural aspects of Quebec published in the Journal, and also in American and British periodicals as well as in other Canadian publications. He recently collaborated with L. Zubkowski in writing a biography of Sir Casimir Gzowski, one of the founders of the Engineering Institute of Canada.

* * *

Sylvia Seeley (*The National Aviation Museum*) is on the staff of the Royal Canadian Geographical Society. She has had an interesting and varied career as an archaeologist, teacher and author.

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by Clark Locke
(The Ryerson Press, Toronto. 105 pp. $3.50).

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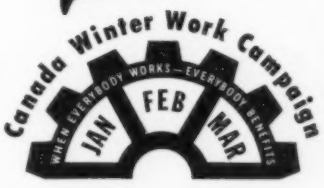

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Country Hours which reminds us that the tranquillity of Nature is always at hand if only we would take the trouble to seek it out. On this point Mr. Clark Locke writes with gentle compulsion; he carries your thoughts and feelings along with him, out into the fresh quiet country-side, to observe and enjoy the hopes and fears of those little creatures that inhabit forest and stream. Often their small lives are fraught with danger far more imminent than ours, and we can share the intense but miniature drama of their failure or success, if we watch them patiently and in silence. "What a rich summer world of curiosities and surprises", he comments in one chapter and tells us of two carp who painfully finned their way overland to reach a particular rivulet; next it was a beaver who expressed himself in no uncertain terms when a party of anglers invaded his private fishing grounds; and then a wild baby duckling who tried to play hookey from his flotilla of brothers and sisters, and duly received the equivalent of a good spanking from his mother, to teach him the rules of the road.

All these things, viewed in the entrancing lights and shades of twilight or dawn are there for us to see, study or just wonder at if we are not too clogged with city life. Out in the fields we can observe comedy and tragedy in varying degrees of intensity, and they offer an endearing parallel to some of the experiences in our own daily path. There is a consolation in watching how the owl, fox, or woodpecker deal with their vital problems. They take what comes with a philosophy we might, upon occasion do well to imitate.

The illustrator of this book has worked in exceptional harmony with the author. The drawn line and the written word combine most happily to tempt the reader out into the open that he may learn for himself something of the life and wisdom of our woodland friends.

SYLVIA SEELEY

Sylvia Seeley has published many articles and book reviews; she works on the staff of the Canadian Geographical Journal in Ottawa.

90° South
by Paul Siple

(Longmans, Green and Company, Toronto. 384 pp. $6.75)

One of the outstanding achievements of the International Geophysical Year was the establishment of a scientific station at the South Pole. A small self-contained village was built on the very spot of which Scott had said "The Pole . . . Great God! this is an awful place." Dr. Siple describes the struggle to establish the Amundsen-Scott station as it is now called. His account of its first year of operation when he served as scientific leader is a human interest story that shows that the purely physical problems of building such a station can be matched by the personal problems of the eighteen men who lived there for a year.

90° South also provides a good introduction to the physical features and the history of Antarctica. About a third of the book concerns the exploration of the continent and the political disputes over its division. Siple first went south as a Boy Scout with Byrd in 1928 and his enthusiasm and love for the "White Continent" comes out strongly in his writing. He traces American interest in the area from Byrd's first expedition through "Operation Highjump" to the days of "Operation Deepfreeze" and sketches in the background of the I.G.Y., and of the American decision to establish a station at 90 degrees south.

Dr. Siple's book is extremely outspoken. He does not hesitate to show the antagonism that existed between Byrd's men and those of Admiral Dufek, leader of the Navy Task Force 43, which transported the men and material of the I.G.Y. to Antarctica. Since Siple is so honest in his account of the stresses and strains among the High Command his relation of man's first year at the Pole is of great value. He does not hide or condone the personal problems of the eighteen men who wintered there 1957-58. Siple's leadership, tact and experience ensured that this was a happy year for the men involved.

There are many personal touches and the book contains much autobiographical material, as well as discussions on some of the author's ideas such as "pole wandering". There is a tendency to overrate both the possibilities of Antarctica and the importance of the South Pole Station. Although wintering at 90 degrees south was a considerable feat, it is doubtful if this "proved there is no technical limitation to habitation required for scientific or commercial enterprises" in this area. Dr. Siple's style tends to be a little bombastic at times but for the most part he writes with a sure clear hand that is both entertaining and illuminating.

JIM LOTZ

Mr. Lotz is with the Geophysics section of the Defence Research Board, Ottawa. He also served with the I.G.Y.

* * *

Six Salmon Rivers and Another
by George Frederick Clarke

(The Brunswick Press Limited, Fredericton, N.B. 190 pp. $5.00)

Dr. Clarke of Woodstock, N.B., former dental surgeon and a noted historian and archaeologist, at 77 vividly recalls angling experiences in New Brunswick since the age of 9. Then his first "salmon", caught on the Meduxnekeag tributary of the St. John, was identified as a common sucker by his mother. Later that year near his mother's former home on the Miramichi, he caught many trout and ate salmon netted by his grandfather and uncles. Hunting, fishing and the woods were in his blood, and when in 1916 the opportunity to fish for salmon arose on the Miramichi, he was on the way to becoming an ardent salmon angler.

His six salmon rivers are the Main Southwest Miramichi, the St. John and its tributary the Tobique, the Restigouche and its Kedgwick and Upsalquitch tributaries. The "other" river is the subject of a brief concluding chapter and refers to the river of contentment, or tranquillity of spirit, which the author tries to attain by recalling angling and other pleasures. "What a sense of comfort, of tranquillity, an open fire imparts on a winter day with the snow blowing like smoke across the fields, or

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This index was prepared by Dr. J. Lewis Robinson, professor of Geography at the University of British Columbia, and includes all articles listed in the earlier one issued in 1948.
Price $1.00 per copy.

from the roofs of nearby houses; and the wind whistling and keening along the eaves of my dwelling."

The book has a clear, straightforward style; and conversations in the first person comprise a large part of it and add interest. The text is accompanied by a comprehensive name index and eight excellent photographs. Reading time is four or five hours.

More experiences are recalled on the Main Southwest Miramichi than on the other rivers, but the early history of each river is outlined briefly, followed by descriptions of angling possibilities and the author's own angling success on typical stretches. One gets a well-deserved appreciation of angling guides, and their usefulness to visiting sportsmen. All those met in the book are what good guides should be — expert at directing canoes down treacherous rapids and poling upstream, instructing precisely where the angler's fly should be cast, manoeuvering the canoe to facilitate playing hooked fish, cooking meals, and even regaling the angler with songs and stories.

Readers who have had little contact with angling will get useful information on general methods of fly fishing for salmon. Experienced anglers should profit by Dr. Clarke's modest descriptions of his own techniques for handling salmon under tricky circumstances. All anglers should be encouraged by his quotation from Izaak Walton — "For angling may be said to be so like the mathematics, that it can never be fully learnt, at least not so fully, but that there will still be new experiences left for the trial of other men that succeed us".

A major virtue of the book is that it shows why angling, particularly fly fishing for Atlantic salmon, has such strong appeal to an ever increasing number of sportsmen. In the author's words — "I do not go to a salmon stream only to catch fish, . . . getting the tackle collected, the trip to the river with friends, and, once there, sitting in a canoe, enjoying the scenery, listening to the birds' singing, and above all, the knowledge that one is having a day off from the ordinary affairs of life, make up half the fun of going fishing."

The author does not try to explain details of the salmon's life history, but one reference needs comment. It is implied that young salmon produced in rivers go to sea, return to rivers as grilse after one winter at sea but do not spawn as grilse, then return to sea for another year when they come back to spawn in fresh water. This is a popular notion, but

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many salmon do return to rivers and spawn as grilse after one winter at sea, while others stay continuously at sea over two winters or longer and then return to fresh water to spawn for the first time. Only a small percentage of adult fish that have once entered fresh water and returned to sea, ever survive to come back to the rivers again.

Concern is expressed over the decline in Atlantic salmon abundance over the past twenty-five years, and the increasing hazards to survival through industrialization. The latter is generally true and since 1942 commercial catches over the whole coast have been below the average of the past 50 years. Fishery biologists are greatly concerned over effects of dams, insecticide spraying and other industrial activities on salmon survival, and remedial measures are being taken in the hope of maintaining stocks at worthwhile levels.

C. J. KERSWELL

Mr. Kerswell, Ph.D., is the Program Head of the Atlantic Salmon Investigations Fisheries Research Board of Canada, at the Biological Station, St. Andrews, N.B.

My Other Islands
by Evelyn M. Richardson
(Ryerson Press, Toronto.
213 pp. $4.50)

The reader who first makes the acquaintance of Evelyn Richardson in the pages of *My Other Islands* may well understand why two of her previous books gained the Governor-General's award.

Few authors have the ability to write on the nostalgic theme of childhood without introducing sentiment of the more maudlin kind. Evelyn Richardson, however, writes of her own fascinating childhood in such a manner that it becomes part of the reader's own existence and whirls its many brightly-coloured facets around him. Her characters too, leave something of themselves in one's mind, long after the book is finished.

It is impossible to read *My Other Islands* without conjuring up visions of one's own childhood and wondering sadly where the years between have gone. It is also impossible to read this book without drawing comparisons between our harsh materialistic present, and the charm and kindness that abounded in yesteryear, that wonderful age which existed before the advent of radio and television broadcasts.

Evelyn Richardson tells us how, somewhere in the middle of December, they all became aware of the approach of the Christmas season. We, who have become accustomed from early November to the annual count-down of the number of shopping days remaining before Christmas, are inclined to wonder how we got away from those wonderful days of which she writes so well.

My Other Islands is a book to delight everyone, but Maritimers away from the Coast will particularly enjoy the tangy freshness of the ocean air which seems to pervade its pages, and with the manner in which the sea and the ways of its sailors affects everyone in it. Grampa, for instance, has long since forsaken the sea and taken to farming. He still appreciates the value of a good boat-anchor, however, and uses one to secure the bull in the farm pond! From its safe anchorage the fearsome bull may graze around the perimeter of the pond, but it may wander no further!

My Other Islands is Evelyn Richardson's fourth book and there is no doubt that she may well count it as another proud achievement. This reviewer recommends it to the young in heart and to the tired in spirit alike, for they will all most certainly enjoy it.

F. J. BULLOCK.

Captain F. J. Bullock is in the Department of Transport at Ottawa, Division of Nautical Safety. He has spent twenty-three years at sea in ocean going vessels; five years he was in command.

* * *

Not Tomorrow — Now
by A. C. Forrest
(Ryerson Press, Toronto. 207 pp. $4.50)

Mr. Forrest's account of his travels, encounters and impressions during a brief but extensive swing around Africa, prefaced by a short visit to the Middle East, will be particularly interesting to the many people whose attention has been focussed on Africa in recent weeks by the dramatic developments in the Congo. With consistently friendly and understanding interest — and formidable energy — the author made his relatively rapid progress through an impressive list of countries: Israel, Jordan, Egypt, Ethiopia, Kenya, the Rhodesias, South Africa, Mozambique, Angola, the Congo (formerly Belgian), the Congo (formerly French) Gabon, Cameroon, Ghana and Senegal. He made it his business to talk to people of all classes and degree of culture wherever he was and the range of his conversational partners runs from anonymous taxi drivers to renowned missionaries, Alan Paton and Albert Schweitzer. The humane and catholic scope of his interest is indicated by the variety of institutions he chose to

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visit: a Kibbutz in Israel, an Arab refugee camp in Jordan, a big game park in Kenya, a circumcision camp, a missionary hospital. There is no doubt that Mr. Forrest is a keen and enthusiastic tourist but it is equally clear that at all times he is intent on discovering the significance of what he sees, of defining some of the important problems of the lands he visits and his impressions of the way the people propose to meet them. The book makes no claim to expertise or scholarly purpose. It is unpretentious, essentially episodic observation by a traveller of intelligence and good will.

Mr. Forrest was thoroughly exposed to indoctrination by both parties to the Arab-Israeli dispute and sturdily resisted conversion to either camp. At the same time he was able to maintain compassion for the aspirations and tragedies of Jew and Arab alike. His reaction of distress at the mutual hatred in the area is easily understood. After leaving the Middle East he wrote "I felt lonely for neutrals and weary of those who had never crossed the (Arab-Israel) border seeing things in black and white. The middle east story looked dull grey to me". And, despite his natural optimism, Mr. Forrest is wise enough not to suggest that any easy solution of the problem is at hand.

One of the principal conclusions the author drew from his African travels (and from which the title of the book derives) was the impatient and insistent determination of Africans to become independent and to govern themselves without further delay. It is interesting to note that in every part of Africa he visited Mr. Forrest found that Ghana had become a symbol of African independence and African capacity for self-government. And the author, on his visit to Ghana, did not find African pride and hope in this country misplaced.

In South Africa, the author's not unexpected distaste for and disapproval of the doctrine and practice of racial discrimination and civil oppression is stated with clarity but restraint. He is aware of the frightening magnitude of the problem faced by this country but he found grounds for hope in the fact that a significant minority of whites in South Africa is dedicated to the establishment of a sane and just multi-racial society. This group is personified for the author by Alan Paton with whom he spent a day and whom he described as "the most Christian gentleman" he met in South Africa.

The author also felt that Alan Paton "was the kind of man I hoped he would be". Quite clearly he was not prepared to say the same of Dr. Albert Schweitzer after his visit to the Lambaréné hospital of this renowned figure. Although the medical relief which Schweitzer brings to his primitive community is willingly acknowledged, Mr. Forrest is patently disappointed that the philosopher-musician-physician-sage is narrowly concerned with the medical well-being of his neighbours and refuses to interest himself in their education or standard of living. Whether or not this is a balanced assessment of Dr. Schweitzer's work at Lambaréné, it is at least refreshing to have an account which is not uniformly adulatory.

Of very considerable interest is Mr. Forrest's narrative of his encounters and visits with missionaries in Rhodesia and Angola. Information about missionary activities in Africa is usually to be found in rather specialized books and journals and it is useful for the general reader to get some idea of the scope and importance of the missionary presence. While proselytising may remain the final objective, day-to-day missionary efforts sound much more like well conceived technical assistance programmes.

In the final chapter Mr. Forrest tries to summarize three major impressions from his travels but the attempt somehow does not come off and the final effect is a little blurred. But this need not detract to any great extent from the lively interest of the whole book.

L. A. D. STEPHENS

Mr. Stephens is Head of the Middle Eastern Division in the Department of External Affairs at Ottawa.

* * *

Recently Received from Publishers

Methods of Regional Analysis. By Walter Isard. (The Technology Press, Massachusetts Institute of Technology and John Wiley & Sons Incorporated, New York.) This introduction to Regional Science deals with the value of different techniques in Regional research.

* * *

The Earth's Problem Climates. By Glenn T. Trewartha. (University of Wisconsin Press). A careful analysis of Regional problems in climate, based on the latest meteorological research, and illustrated with numerous diagrams and charts.

* * *

The Discovery of the Pacific Islands. By Andrew Sharp. (Oxford University Press, Toronto). A valuable history of Pacific exploration with reference to early ethnological records made before the Polynesian people were influenced by western culture.

* * *

Energy in the American Economy 1850-1975. By Sam H. Schurr and Bruce C. Netschert. (The Johns Hopkins Press, Baltimore). An extended view of the history and prospects of American Economy over a period not yet completed, based on the consumption of Energy.

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Indians Days of the Western Prairies. By Marius Barbeau. (Department of Northern Affairs and National Resources). This bulletin is a tastefully presented and fully illustrated record of Mr. Barbeau's well-known researches in North American anthropology.

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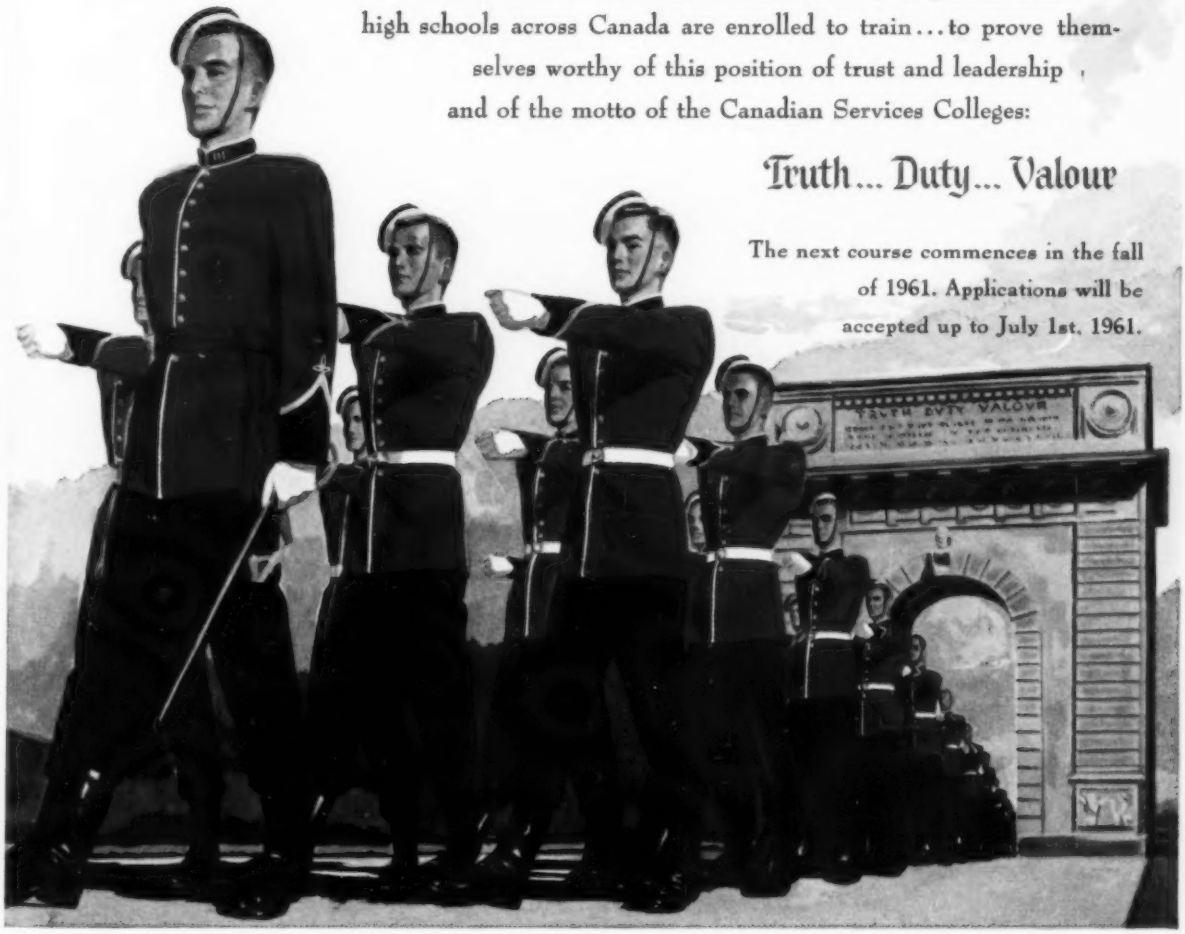

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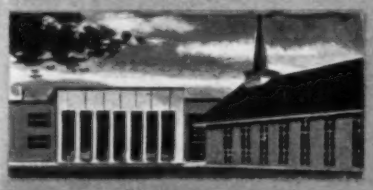

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